

A STUDY OF ACCENT ;

Research into Its Nature and Scope in the Light of Experimental Phonetics

By

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P 44 l. 31 Typen in (9).
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PREFACE

1. The present study is based on experimental research in speech-sound made in the phonetic laboratory of the Tokyo School of Foreign Languages, which was designed and established by the author under the auspices of the School. And its primary object is to investigate into the nature of accent.

2. Most of the previous experiments in accent and intonation have been conducted without strictly scientific equipment, and even when the kymograph was used, pitch-curves alone were resorted to, stress being, to a large extent, ignored by reason of the difficulty met with in measuring it accurately. In view of this, an attempt has been made in the present study to improve the conventional system by the use of oscillograms of speech-sound. With the help of oscillograms, pitch and stress of sound have been measured and represented in curves with scientific accuracy. It is here that subjective judgment comes in with the result that the nature of accent has been thoroughly expounded.

3. Firstly, a study has been made of the pitch, stress and sonority each vowel comes to possess when pronounced by itself. Secondly, classifications have been made from the standpoint of "Gestalt" of monosyllables and bisyllables of seven languages, i.e., Japanese, English, German, Chinese, Korean, Spanish and Malay. As a result, it has been revealed that each language is possessed of "tone-form" peculiar to itself and that various types and kinds of accent are recognizable in those languages which have casually been labelled either as pitch accent or as stress accent languages.

4. In order to facilitate the study of intonation and melody, various phases of "tone-form" have been singled out and further study has been made on the impression each gives to human ear.

5. A language as material of speech, contents to be expressed, manner of pronunciation, tone, etc. may be mentioned as factors in the determination of a certain concrete form of speech. From the phone-

tic point of view, however, the most important is the first factor, i.e. language, to speak more precisely, its speech-sound, syllables, word-structure, kinds of accent, syntactical patterns, etc. In order to see how the peculiarities of these affect the general tone of speech-sound, an examination has been made of many sentences in nine different languages, viz. English, German, French, Japanese, Chinese, Korean, Hindustani, Russian and Mongolian, each of which is distinguished by its own characteristic type of accent. As a result, it has come to be clearly understood what word accent, collocation accent, and sentence accent are, what position they take and how they are utilized in the sphere of language.

T. CHIBA.

June 30th, 1935.

ADDENDUM:

Since in the present work, tone quality is not strictly dealt with (an investigation into tone quality will be made and published later), some of the phonetic letters used as symbols for pronunciation are similar to the Roman script.

The phonetic signs for Chinese, Korean, Hindustani, Russian, Mongolian, etc. are those which are being actually employed in the departments of these respective languages in the Tokyo School of Foreign Languages with the exception of Korean, (phonetic symbols used in the case of this language being those adopted by the Korean Phonetic Society, etc.). In the cases of Hindustani and Mongolian, the symbols employed are not so much phonetic transcription as the romanization of their alphabet.

CHAPTER 1

INTRODUCTION

I. 1. Definition of Accent and Other Technical Terms.

The word accent as a general term was originally derived from the Latin "accentus" which pertained in its first stage only to the pitch of speech-sound; but there has since been a gradual shift in meaning, and now the sense of the word varies in different languages, and has wider and more divergent applications than formerly. I am confident, however, that the definition and use of the term may be stated as follows, when the subject is considered generally and in a brief manner:

I. Accent is said to fall on that syllable of a word which has either a stronger stress or a higher pitch than any other syllable.

II. When there is a definite relation either between pitch or between stress among the syllables that form a word, that relation is called accent.

The inadequacy* has often been dwelt upon by many of an attempt to distinguish the accented syllables of a word from the unaccented.

Definition I. has usually been resorted to for the sake of convenience in teaching certain languages; from the standpoint of phonetics, however, definition II. is preferable. Some languages have more or less established arrangements of pitch in the syllables of the word, while others have those of stress. The former are languages with pitch accent and the latter with stress accent. For instance, in the Japanese word *ta-ké*, so long as the *ta* syllable is lower in pitch than the *ké*, it is immaterial whether *ta* is stronger or weaker. From this point of view, therefore, it may be said that Japanese is a language with pitch accent. Again, in the English word "knowledge," if only the syllable *know-* is stronger than the syllable *-ledge*, it makes little difference whether the initial syllable is higher or lower in pitch than that which follows. From this, English can be described as a lan-

* See Scripture. "Elements of Experimental Phonetics," p. 508.
See Dr. K. Sakuma: "Pronunciation of Japanese," p. 388.

guage with stress accent.

In determining, with reference to a given language, whether it belongs to the "pitch accent" group or the "stress accent" group, recourse should be had to the following criteria:

(a) To ascertain whether the pitch and stress in the syllables of a word are not subject to change, in whatever position the word may occupy in a sentence—it should be borne in mind that in such a case the terms pitch and stress will hereafter be used, not in the sense of absolute pitch and stress, but to indicate the relative pitch and stress within the word itself.

(b) To make sure whether a given word is liable to be deprived of its peculiarity when the pitch and stress are made to vary in many ways.

(c) To find out which remains immutable, the pitch or the stress, free from personal equation, when one and the same word is pronounced by different individuals. The immutability, however, does not wholly account for the quality of accent, but only partially.

In view of these facts, the definition of accent may now be stated: accent denotes such a relation of pitch, stress and speed of sound as is characteristic of a given word. If the stress typifies a word, it should invariably remain constant, and so should the pitch for the same reason. In this way, we can distinguish the stress from the pitch accent.

How the accentual peculiarity of each element gives it a feature, when several words form a sentence, or conversely what sentence (regarding the construction, tone and phraseology) has such and such a kind of word accent, or whether or not only "syllable accent" is allowed to exist, or what it is like, if it admits of "sentence accent" besides—all these questions only the future can solve. In this study, however, some attempt has been made to suggest a possible answer to these questions.

Different persons have adopted different terms for pitch, stress and speed of speech-sound. Indeed, several words have been used to denote one object only, or vice versa. No wonder a good deal of complexity has been caused. To define the term correctly, it becomes necessary to understand thoroughly the object in view. In the terminology suggested below, conflicting terms will be avoided as much as possible for fear of confusion with those that have already been

adopted. I shall now give terms best suited and define such as have already been named.

(a) Tone may be defined, in contradistinction to phoneme, as a comprehensive term for the note of a language (including pitch, stress and time): e.g. the Hindu language is of monotone.

(b) *Kuchō* and *gochō*, though analogous in meaning, are more or less limited in application as compared with tone: e.g. *gekietsu naru kuchō* or violent tone; *totsu totsutsu taru gochō* or faltering tone; *bubetsu no nen o arawashita gochō* or contemptuous tone. The corresponding term in English is also tone.

(c) Style is a mode of speaking: e.g. conversational style; recitative style; stage dialogue style, etc.

(d) Intonation may be defined as the variations which take place in the pitch, stress and speed of the voice in producing speech-sound: e.g. one and the same sentence may have quite different shades of meaning with different forms of intonation; we often hear a remark such as: "His speech is rich in intonation."

(e) Stress is defined as the degree of force in utterance. The objective volume of the attributes of the voice, is the pressure amplitude, frequency and energy (or intensity); this last being in proportion to the square of the product of the pressure amplitude and frequency. The stress, consequently, means both subjective strength of the voice and force of breath.

(f) If we speak with stress, the voice becomes stronger and higher. By a stressed syllable is meant, however, a syllable that is strong in stress but not necessarily high in pitch.

(g) By means of emphasis, a certain word can be made especially prominent and can be given much force. Emphasis does not always refer to "strong utterance" alone. The emphatic effect may be produced by the use of a sentence well suited to the purpose. It may sometimes happen that an ordinary sentence is emphasized by reason of due expression.

(h) Emphasis is often used to attach weight to some words, phrases or sentences according to the sense or purport of the speech or accor-

ding as the usage of the language dictates. This, however, has nothing directly to do with pronunciation.

(i) Exaggeration is defined as a method by means of which, the pitch, stress and speed are made to vary more than regularly. Whether or not this succeeds in giving any marked effect psychologically is quite another matter.

(j) When speaking in this book of the tone as rising, falling or level, this does not refer to the stress but to the pitch alone.

(k) The definition having already been given, the term accent will do also in Japanese. *Gosei* is, however, the corresponding Japanese term.

It seems that the words "accented sound" in a language of the "stress accent" group, refer to such sounds as give the hearer a keener impression psychologically. The term "akzentuieren", on the other hand, is intended for such sounds as give greater acoustic effect—generally, stronger, higher and longer—physically. As a musical term, accent means louder sound of the intensity rhythm. But when it comes to the accent of words, accent may be said to occur where A syllable is either stronger or weaker than B, it being, so to speak, a mere covenant in the sphere of pronunciation. Moreover, in some cases, we have the level accent when two syllables are equal in stress. Thus, "accented syllable" comes to lose much of its *raison d'être*. It can safely be said, therefore, that what has been called by the term "accented syllable" should be designated with terms such as "syllable pronounced with stress", or "the strongest syllable", or "the highest syllable", or "syllable that gives the greatest acoustic effect," instead of the definition that has previously been accepted. As is usual in colloquial speech, in which words are often given double meanings, the word "accent" is often used as synonymous with "stress". It may be advisable to use the word in this application distinctly from yet another sense of the same word such as in "accented syllable". Happily, German has such a fit term as "betonte Silbe", whereas neither Japanese nor English has this advantage. Although Dr. Sakuma* adopts in his

* See Dr. K. Sakuma: "Pronunciation of Japanese," p. 382.

works some such phrases as "syllable at the peak of accent", and "syllable at the top of accent", these cannot be said to be invariably appropriate. In the present thesis, therefore, I shall use a suitable word according to circumstances.

I. 2. Equipment for Experiment.

Before treating the main subject, a brief survey will be given on the experimental equipment that has furnished the data.

The experimental work consists of two processes: i. e. the photographing of the sound wave with the aid of a condenser microphone, amplifier and oscillograph*; and the measurement of the frequency, amplitude and time of the sound as recorded on the film.

It goes without saying that this method is by far superior to that in which the kymograph or other instruments are used for the registration of the sound wave. The sensitiveness of the microphone, however, cannot be constant with varieties of frequency of sound. In case a frequency that the microphone can feel most sensitively approximates to that of the formant of a certain vowel, the amplitude of that vowel is magnified more than in any other vowels. It is a pity that in this way absolute accuracy is not to be expected in the course of the experiment.

To measure exactly the relative amplitude of a vowel, first of all, a complete analysis of the vowel is necessary. The result will be adjusted then through the sensitiveness i. e. amplitude frequency of characteristic of the microphone, and after that it will be made into wave form by a synthetic process. This done, the measurement of amplitude is possible. To repeat the exact process with each individual vowel, however, is very complex and is (moreover) hardly practicable.

Besides, too much strictness is not required for the present purpose. The records on the film are accordingly used without any modification.

However, the pitch of sound can be measured precisely. The subjective pitch of sound corresponds with the objective frequency, the form-

* See Dr. G. Obata: "Experimental Acoustics," p. 117.

er being in proportion to the logarithm of frequency, within the scope of speech-sound. The pitch of speech-sound, however, generally varies within the range of one octave, and within this scope the logarithmic scale does not differ much from the ordinary one. In addition, with speech-sound, the relation between the actual change in frequency and the psychological interval is no simple logarithmic one. 'On the contrary, there is a vast difference between the two in the rapidity of change in pitch and stress. Consequently, it becomes necessary that for each pitch-curve a different form of gradation should be given if the change in the psychological pitch is to be represented most minutely by means of the pitch-curve. The physical scale is preferred for this reason, while at the same time considering the economy of time and labour necessary for the complex enumeration. Thus, the pitch and stress will be made to correspond with the frequency and amplitude respectively. In the graphic diagram of the pitch-stress-time curve that will be given in the following sections, the abscissae and the ordinates stand respectively for time (unit: 1/50 sec.) on the one hand and pitch (above) and stress (below) on the other. A syllable has been chosen as unit, instead of each separate sound, in the interpretation of the curve, for the former system has the advantage of being legible. Vowels are greatest in amplitude (stress), next come nasals followed in turn by liquids, voiced consonants, *f* and *tj* in the given order. The other voiceless consonants are very small in amplitude or are held for so short a period of time as not to be perceptible in the diagram.

I. 3. Pitch, Stress and Sonority of Vowels.

Previous to the classification of accent, it may be considered to what extent human ears can follow the different pitch and stress of each vowel.

With whatever equal pitch and stress, *a, i, u, e, o*, may be produced the investigation of the film record of the resultant sound waves reveals a considerable difference in amplitude between the vowels. The table given on the next page shows the amplitudes (the upper rows) and frequencies (the lower rows) measured from the oscillo-

grams of the five Japanese vowels uttered by eight different persons.

The column on the extreme right is for the figure representing the mean amplitude of the five vowels as produced by each individual, obtainable when the average amplitude of the five vowels is fixed at 1. For instance, in the case of the speaker M, the amplitude of *i* is 6.0 m.m., the pitch 198, the average amplitude of the five vowels being 12.0 m.m. Supposing that this last is fixed at 1, the figure for the amplitude of *i*, stands at 6 m.m./12 m.m.=0.5.

Even when *a*, *i*, *u*, *e*, *o*, are pronounced successively, the pitch of each varies with individuals. Generally speaking, however, the pitch is lowest with *a* and gradually rises with *i* and *u* reaching its highest with *u* and *e*, after that, it is again on the decline with *o*. Variations in pitch are more marked in the case of the female voice. As for amplitude, it is smaller with *i*, *u*, and larger with *o*, *e*, *a*.

Pitch and Stress of Japanese Vowels

Pronouncee	a		i		u		e		o		Average amplitude
M	mm 16.5 169	1.37	mm 16.0 198	0.5	mm 10.7 211	0.89	mm 13.5 218	1.13	mm 13.5 216	1.13	mm 12.0
T	6.5 150	1.00	4.0 168	0.62	5.0 178	0.77	7.0 187	1.08 187	10.0 187	1.44	6.5
N	6.0 128	1.05	4.5 136	0.79	5.0 139	0.88	5.0 136	1.88 127	8.0 127	1.40	5.7
Y	6.0 131	1.02	3.2 161	0.54	7.0 163	1.19	7.3 168	1.24 155	6.0 155	1.02	5.9
A	13.0 214	0.92	12.0 228	0.85	14.5 234	1.03	14.0 224	0.99 222	17.0 222	1.21	14.1
K	13.5 137	1.15	7.0 137	0.6	9.5 149	0.81	11.5 156	0.99 155	17.0 155	1.45	11.7
F	9.0 181	1.17	3.0 179	0.39	6.0 202	0.78	8.5 178	1.10 176	12.0 176	1.56	7.7
H	7.7 173	0.81	9.0 192	0.95	12.0 192	1.26	10.0 182	1.05 190	9.0 190	0.95	9.5
		1.06		0.65		0.95		1.06		1.36	
	160		175		174		181		178		

The average pitch of the eight different voices is 160 for *a*, 175 for *i*, 174 for *u*, 181 for *e*, and lastly 178 for *o*. The average amplitude, on

the other hand, is 1.06, 0.65, 0.95, 1.06 and 1.36 respectively.

As is clear from the foregoing, in case the vowels are separated from one another for an appreciable amount of time in utterance, a difference in pitch, if any, may not distinctly be observed. The pitch varies to a marked extent in the production of one single vowel. As for stress, it varies considerably with different vowels, not only in the case of one individual but also when represented on an average basis with regard to many. To find out the cause, a method may be suggested of changing the degree of opening of the lip-passage in utterance of the sound. In normal speech, *a* is greatest in amplitude, next comes *e*, followed in turn by *o*, *i*, *u*, in the given order. But if the five vowels are all formed with the lip position for *i*, (it is of course impossible, I know, to produce each exactly in this way; but the peculiarity of each can still be retained with comparative ease: thus, *i* may be so pronounced as not to be confused with *e*,) they are almost level (with one another) in amplitude. Similarly, when pronounced with the regular lip-position for *e*, they are very much like *e*, in amplitude. Therefore, it may be said that the stress very largely depends upon the degree of opening of the lip-passage. Of the eight speakers, the one who pronounced all the vowels with similar amplitude is the one with whom little variation was perceived in the lip-position. Conversely, the variation in amplitude points to such an individual as pronounced with more labial movements.

Thus it seems that there is no definite relation between amplitude and pitch.

That the amplitude is smaller with *i*, *u*, and that this smallness in stress is not so distinctly observed as in others is, in my opinion, not due to the question of the sonority of these vowels. (Although Prof. Jinbō defines sonority as relative stress of each unitary sound as pronounced with the same degree of force of utterance, here I shall regard it as basic quality to determine which of two unitary sounds with equal amplitude and frequency is more sonorous irrespective of the force of breath of the speaker.*) It is a well-known fact that the sonority becomes altered in the pure tone if the pitch varies, even though the amplitude remains constant. For instance, a sound with a frequency of

* K. Jinbō "Japanese Phonetics," p. 96.

2,000 is much more sonorous than another with a frequency of 50 that is equal in amplitude.

The question now arises whether a sound with a relatively small amplitude can produce by reason of its sonority the same psycho-acoustic effect as another with a greater amplitude. As will be illustrated in the following examples, if we receive stronger acoustic impressions from them than from others, even *i* and *u* are larger and higher in amplitude and pitch. After all, it seems that human ears are not dependable in comparing two vowels, at least with quantitative stress as a sole criterion. Thus, we have now to solve the question how the subjective stress is measured. It may be said, I suppose, that any two sounds that are level in both amplitude and frequency are usually so in sonority too. In consequence, the stress of a sound will hereafter be represented by its amplitude.

It is possible to speak in such a way as to make the stress and pitch vary independently of each other: e.g. we can sing a song with the same stress as in speech or alter the stress while the pitch remains quite unchanged. Generally, as has been explained, the voice becomes higher as well as stronger, when we speak with stress.

Thus, in the case of normal speech-sound with comparatively less intonation or a word uttered by itself, a syllable at the "peak of accent" is usually higher and stronger than any other. As far as one single syllable is concerned, it is often observed that the stress and pitch run inversely: i.e., the higher the pitch the weaker the stress becomes or vice versa.

Without any further remark on this phenomenon, an attempt will be made at an objective classification of accent with regard to pitch and stress. The data used in this investigation are from eight languages, i.e., Japanese, English, German, Spanish, Chinese, Korean, Hindustani and Malay. The speakers are those who speak their respective mother-tongue in standard type of pronunciation.

CHAPTER II

TYPES OF ACCENT AND SOUND PSYCHOLOGY

II. 1. Classification of Types of Accent in Respect of
External Forms.

In the classification of the types of accent, words of two syllables have mostly been treated, while at the same time reference has been made, when necessary, to polysyllables.

- (A) The stress and pitch vary proportionally throughout a word.
- (B) The stress and pitch of the two syllables vary inversely.
- (C) The stress remains almost unchanged, but the pitch varies.
- (D) The pitch scarcely changes, but the stress varies.
- (E) Both pitch and stress change, but only very slightly.
- (F) The stress remains approximately constant, but the pitch rises in the first and falls in the second syllables.

(G.H) The stress hardly varies, and the pitch-curve takes a mountain shape in the initial syllable, and is on the decline in the second.

(I) The stress scarcely alters, and the pitch-curve makes a triangle.

(J) The pitch ascends, and the stress changes in different ways.

In the following, each will be studied in detail.

(A₁) The stress and pitch vary proportionally all through the word and each syllable makes a mountain shape (when represented in curve).

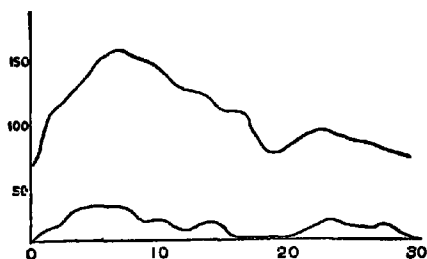


Fig. 1. Erbe

In Fig. 1. are shown the pitch and stress curves of *Erbe*.

Erde, Erbe, Ehre, horen, leidet, and many other German words are of this type; *bony* shows an example in English.

Many Mongolian words belong to this type, in which, however, the last syllable is the highest and strongest.

This occurs mostly when a word consists of vowels and voiced consonants alone. Those words which contain voiceless consonants do not fall under this class.

(A₂) (Because of the voiceless consonant, the pitch-curve is broken and) the correspondence between the two curves is destroyed to a certain degree, but not at all fatally (Fig. 2). German *Vater*, *loschen* English *pity*, *merry*, *gather*, *bushy*, *china*, *toilet*, etc. are all grouped under this class.

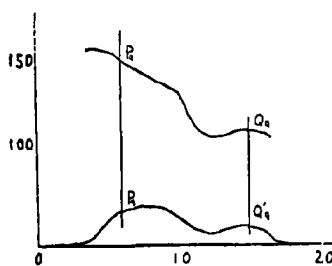
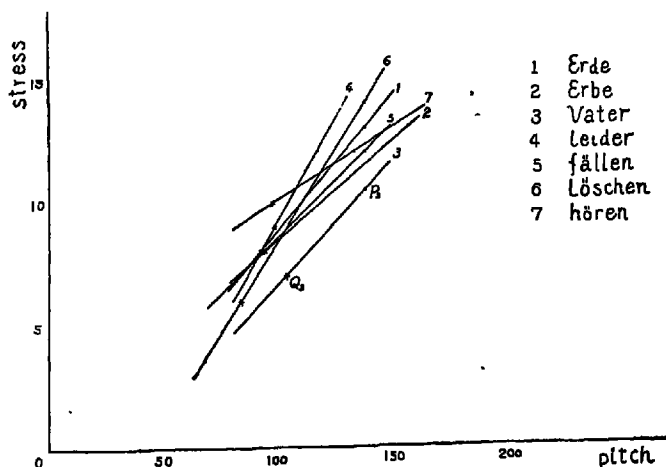
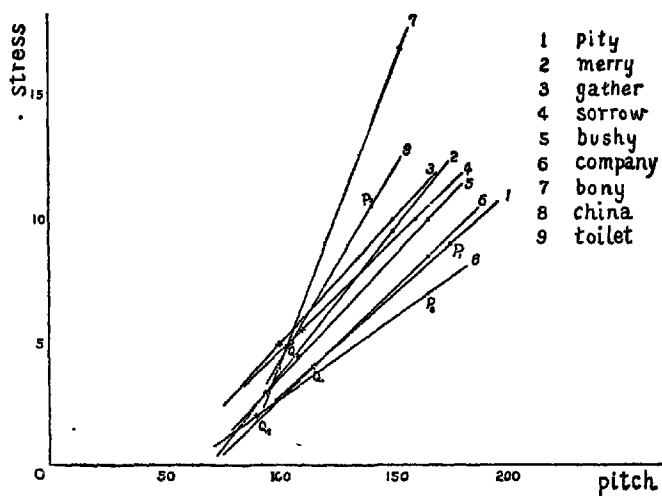


Fig. 2. toilet

In the case of (A₁) type, there is a close correspondence between pitch and stress, and so a syllable can be represented by the highest points of both pitch and stress. As the two points do not regularly coincide in (A₂), a syllable cannot be represented in this way. Words of this type can be found, however, in large numbers

in those languages which have "stress accent." The stress-curve at the height, therefore, is made to represent the syllable: in Fig. 2 (toilet) P, P'; Q, Q' are the points representing the syllable. Fig. 3 & 4 are represented by co-ordinating pitch and stress. The abscissae and ordinates stand for pitch and stress respectively. This is done after having fixed the points representing the two syllables of the words in (A₁) and (A₂).

The result may be somewhat influenced by personal peculiarity, as the data are from the speech of an Englishman and a German (respectively). Though it varies with different words even in the case of speech by one and the same person, still on an average, the interval between the two syllables is, in German, a fifth and the ratio of stress (amplitude) 1.4; and in English, a fifth and 2.6 respectively.



Above Fig. 3. Below Fig. 4.

This type is, however, very rare in Japanese *even when a word is uttered by itself*. Moreover, the highest points of the pitch and stress never coincide, so that it is difficult to fix the points representative of the syllable. The separate studies of pitch and stress reveal that the interval between a "syllable at the peak of accent" and another ranges mostly from a second to a fourth and amounts in rare cases to a fifth, an interval much smaller compared with that in English or German which attains a fifth on an average. But in recitation or stage dialogue, the interval is sometimes extremely exaggerated with the result that it often reaches a major sixth. The ratio of stress for the dissyllable is given below in tabular form. It varies considerably with different words and is not so regular as in English or German.

<i>hato</i> (pigeon) 1.0	<i>tōgan</i> (gourd-melon) 1.3
<i>sake</i> (wine) 1.6	<i>aki</i> (autumn) 1.1
<i>baba</i> (old woman) 1.4	<i>iro</i> (colour) 2.0
<i>aki</i> (space) 1.0	<i>sake</i> (salmon) 1.5
<i>hata</i> (flag) 1.5	<i>mochi</i> (rice dumpling) 1.2

(A₃) There is no close relation between the curves of pitch and

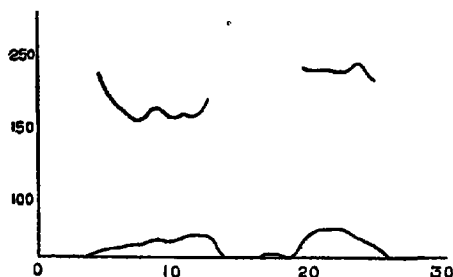


Fig. 5. *mochi*

stress (the curves of pitch and stress do not run parallel to each other), but at least the order of magnitudes of the two curves coincide (Fig. 5). The dissyllables and polysyllables given below belong to this class:

mochi, akari, laboratorial, organ, feverish, pitiless, goldfever, baker, clearly, birthday, houses, etc.

(A₄) With the dissyllable or polysyllable, the pitch-curve is of mountain shape reaching its highest in a certain syllable and the stress-curve goes up a little at some point in each syllable. (In this case,

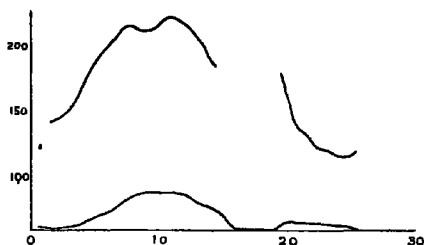


Fig. 6. obāsan

In addition to *obāsan* (Fig. 6.), Japanese *eiga* (cinema), *mori* (harpoon), *baba* (grandmother), *kōrogi* (cricket), *soramame* (beans), English *murmur*, *murmurously*, etc. are of this class.

(A₅) This somewhat resembles the type (A₄) in having the pitch climax in the initial syllable. The initial syllable is, however, a little

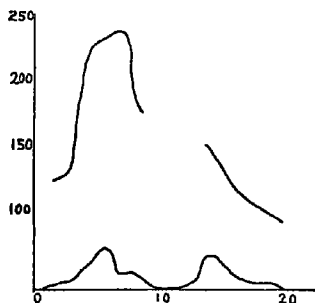


Fig. 7. virgen

stronger in stress than the final one, and the very steep pitch-curve characterises this type. The rising portion of the pitch-curve is almost coextensive with the first syllable towards the end of which it reaches its height. Fig. 7. shows an example. This type is frequently found in Spanish: e.g. *punto*, *virgen*, *silla*, *cerro*, *bajo*, *boda*, etc.

The interval of the rising pitch is a minor fifth on an average when the stress and pitch are on the increase concurrently, and is a minor third when the pitch ascends suddenly after the stress has considerably increased. In both cases, the average interval of the falling pitch is a seventh.

(B) In the dissyllable, the order of magnitudes of the pitch and stress of the two syllables vary inversely.

As is shown in Fig. 8. the "syllable at the peak of accent" has smaller stress, though higher in pitch. Japanese *nīsān* (brother), German *über*, etc. are of this type.

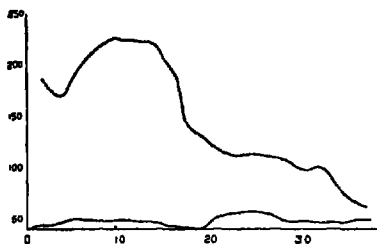


Fig. 8. über

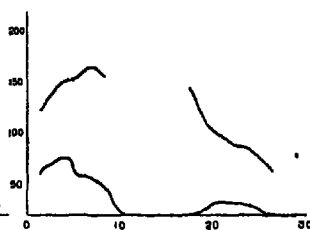


Fig. 9. Beute

The diphthongal Beute [boytə] baker [beikə], etc. cannot strictly be described as dissyllabic. [y] and [i] are, however, weaker but higher than [ɔ] or [e] ; see Fig. 9. Close vowels such as i, y, ü, etc. are, judging from this, liable to be pronounced with a higher pitch.

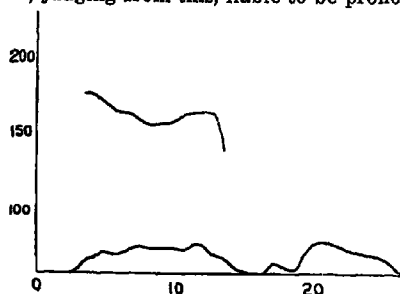


Fig. 10. aki

(C) The stress hardly varies, but the pitch does. Japanese *aki* (space) (Fig. 10.) is an excellent example; so also Japanese *tori* (bird), English *pity*, etc.

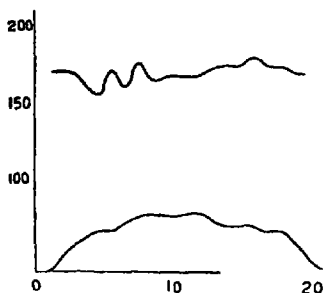


Fig. 11. morau

(D) The pitch stays almost constant, and the stress either varies or remains immutable. Japanese *morau*, *tōgan*, *kanemochi*, *taue*, etc. are of this type (Fig. 11.).

(E) A certain syllable produces a stronger psycho-acoustic effect and yet differs but slightly in pitch and stress from others. This, however, is not of the same type as what Dr. Sakuma calls "flat-accent".

Only the Japanese language has words of this type: e.g. *ai* (love), *u-ni* (sea-urchin), *ine* (rice-plant), *soramame* (beans), *aozora* (blue sky), etc. In Fig. 12. *uni* is illustrated, and in this the sudden elevation in pitch is particularly noticeable.

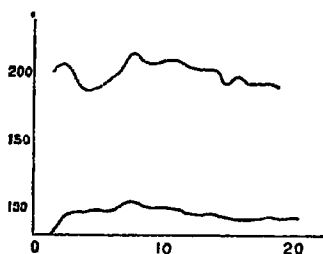


Fig. 12. *uni*

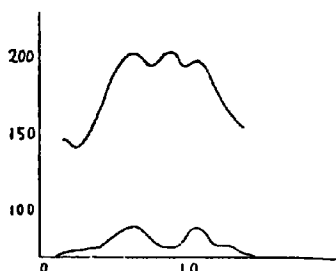


Fig. 13. *belot*

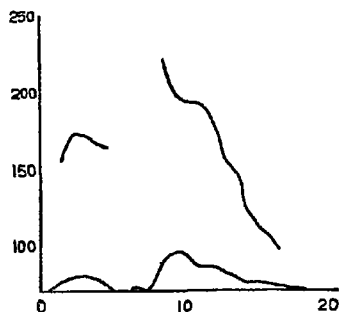
(F) As in the (A.) type, the pitch-curve is of mountain shape, only much steeper. Unlike that type, however, the height is on neither syllable; though the pitch rises in the initial and falls in the last syllable, the pitch climax is somewhere intermediate between the two. In addition, it more or less resembles the (E) type in that it gives an impression of "stop" on account of the sudden rise in pitch.

The stress also gains or diminishes according as the pitch rises or falls, and the stress-curve assumes a triangular form with a vertex much inclining toward one direction. There is little difference in stress between the two syllables.

Malay furnishes a good many examples of this type: e.g. *tiram*, *belot*, *asap*, *orang*, *buang*, *ulat*, etc. The in-

terval of the rising pitch is about a fourth when the rising occurs initially, and a second when the pitch goes up only after the stress has sufficiently increased. That of the falling pitch is a sixth on an average.

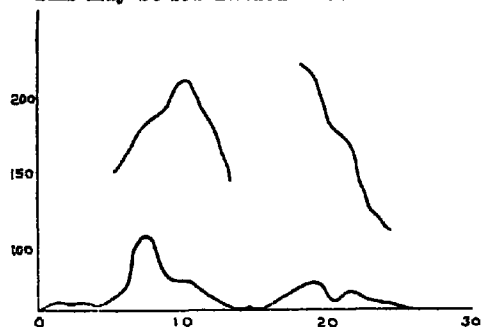
(G) Sudden rise and fall in pitch characterizes the Malay language; but when a word the second syllable of which begins with a voiceless consonant is pronounced in the same manner as in (F), the result will be as that illustrated in Fig. 14. Malay *ilan*, *makan*, *esok*, etc. show examples of this type. The pitch-curve for the Japanese long consonant (sokuon) (e.g. *nikkō*, *kekko*) is similar to that of this class.

Fig. 14. *ikan*

In the case of the former, however, the time-interval between the two syllables ranges from 7/50 to 10/50 sec.—greater than that for the (G) type which varies between 2/50 and 3/50 sec. The Japanese long consonant in *ikken*, in quicker pronunciation, becomes akin to Malay *ikan*.

(H) The two syllables are almost level in stress, and the pitch-curve forms a mountain shape in the first syllable, while the second shows a falling tendency. See Fig. 15.

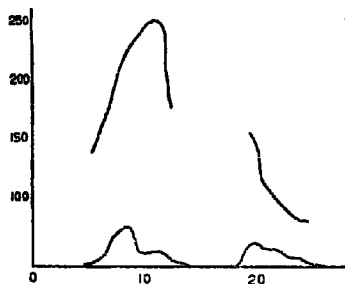
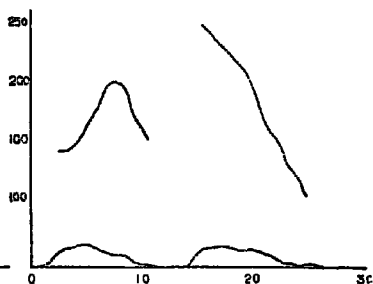
This may be sub-divided into:

Fig. 15. A. *thal tʃhum*

(i) Both initial and final syllables are equal in pitch at the height. See Fig. 15. A.

(ii) The initial syllable is higher (Fig. 15. B.).

(iii) The final syllable is higher (Fig. 15. C.).

Fig. 15. B. *an ʔdʒa*Fig. 15. C. *dʒan ʔgun*

These are all Korean, of which **학교** [haŋ, ǵjo], **오빠** [o^ʔpa] **탈춤** [thal tʃum] belong to (i), **한 짜** [an ʔdǵa] to (ii), and lastly, **장군** [dǵan ʔgun] to (iii); [haŋ, ǵjo] and [o^ʔpa], however, seem to resemble the Malay words of the (G) type. But in the Korean words, it takes much longer to shift from one syllable to another, for they are long consonants. Korean words that are so built that the final vowel or consonant of the first syllable which is short is liable to link with the initial consonant of the second, are very like Malay words. As compared with the latter, however, they are apt to be pronounced in a more protracted manner so that the rise and fall in pitch is less rapid.

(I) The initial syllable is of rising and the second of falling tone. The pitch-curve is similar to that for the (F) type, but the fall is much more gradual. When a word that ends in and begins with a voiced consonant in the first and second syllables respectively is produced in the same manner as in the (H) type, its accent becomes of this type (Fig. 16.): e.g. Korean **한자** [a:n dʒa], **궁닐** [ǵon njil] **팔리** [ʔpal li] **닐리** [nil ni li], etc.

Successions of syllables such as **푸름 푸름** [phurɪm phurɪm] that are formed by repeating one and the same short dissyllable, are similar in pitch to the dissyllable standing by itself.

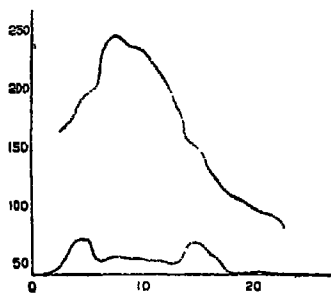


Fig. 16. gŏn njil

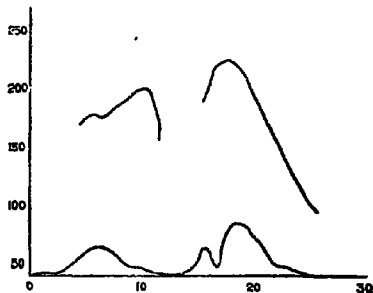


Fig. 17. phurɪm phurɪm

Japanese *ao-ao* is no mere repetition of *áo* but [aó-áo]; similarly in Korean too, there seems to be the transfer of accent in phrases.

(J) The Hindustani word, when pronounced by itself, varies but little in pitch and stress. A gradual rise in pitch is, however, its peculiarity. The stress is greater sometimes in the initial and sometimes in the final syllables, there being no regularity.

(i) In dissyllables, as is shown in Fig. 18. [kharnar], the pitch continues to rise until the stress reaches its climax in the final syllable, and then begins to fall as the stress decreases. Besides [kharnar], [gajar], [dgarer], [thorax], [zálim], [zala], etc. are good examples. The symbol ['] is attached to a comparatively stronger syllable, the absence of which indicates that the two are *all level in stress* (similarly stressed).

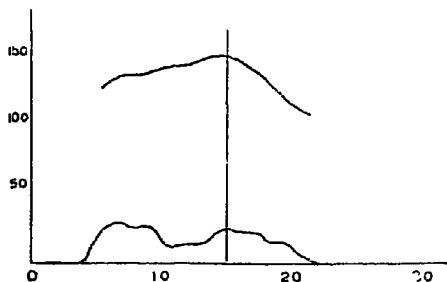


Fig. 18. kharnar

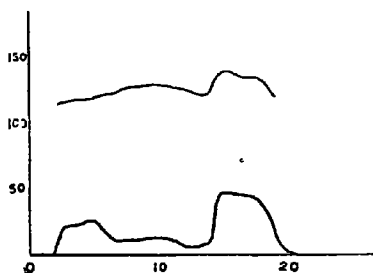


Fig. 19. pandit

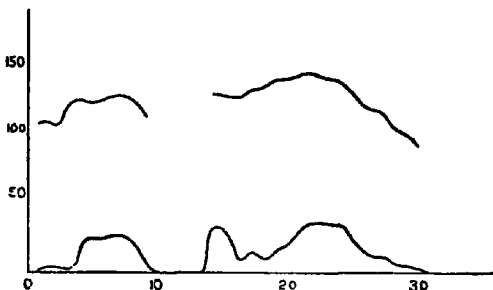


Fig. 20-1. dorpaher

Because of a voiceless consonant with which the last syllable begins, the pitch-curve may sometimes be broken. By linking it up, however, we have such a continuous curve as is shown in Fig. 18.

Examples: [lerkín], [maslam], [háṭam].

(ii) The final syllable rises in gradation. Of the Hindustani words used as material for this experiment, [pandít] (Fig. 19). and [suddí], each of which begins with d in the last syllable, belong to this class.

(iii) Dissyllables the second syllable of which is longer than the first or trisyllables when they are divided into two breath-groups of which the second element is longer, are something like [dorpahér] in Fig. 20-1.

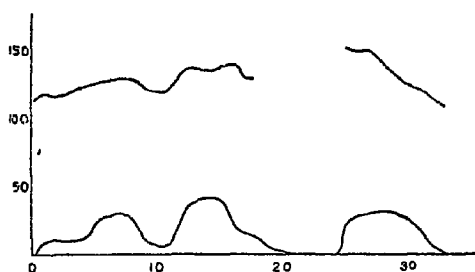


Fig. 20-2. maðrser

It may be noted that with this type the pitch tends to rise gradually. Beside [dɔrpa-hér], [taklɪf], [marɪz], [zabárn], [pázmurdah], etc. all furnish good examples. In the case of [maðárser] (Fig. 20-2), however, the initial breath-group is longer.

II. 2. Variations in Pitch and Stress within a Single Syllable and Sound Psychology.

Experimental studies of speech-sound that have hitherto been made have a weakness in that stress, one of the most important sound elements, has been neglected in the discussion of accent and intonation. The measurement of stress being a matter of difficulty, the pitch-curve alone has been resorted to in such cases.

It is necessary, however, in the study of speech-sound to know not only the pitch but also the change in stress. The absence of knowledge in one or the other is indicative of an incomplete investigation of sound. Even when the pitch-curve is similar, the acoustic impressions produced differ much with the variant degrees of stress. In the following will be studied, through actual examples, varieties of combinations of the varying pitch and stress and acoustic impressions they give.

- (i) The pitch falls gently simultaneously with the decrease in stress.

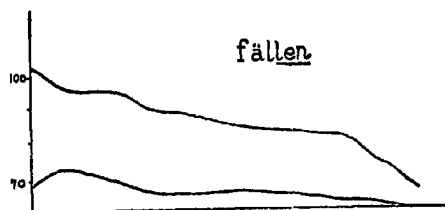


Fig. 21-1.

German *loschen*, *uber*, *fällen*, *asyl*, English *baker*, *bushy*, *laboratorial*, etc. are of this type.

In Japanese *sushi* [suʃi] *sake* [sake] *mori* [mori] *niisan* [ni:san] *hato* [ha-to] *obāsan* [oba:san], etc.,

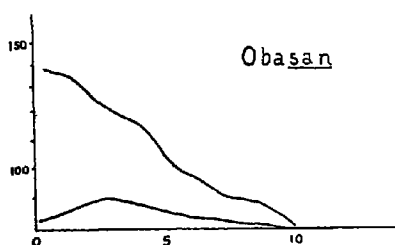


Fig. 21-2.

however, the fall in pitch and the decrease in stress are noticed a little more prominently. The sound with this type of pitch and stress gives psychologically a feeling of inertia.

This is also the case with the final syllable in Korean and Malay. In these languages, however, the falling interval is greater and rapid so that the sensation produced is rather stronger.

(ii) The pitch falls slowly, while the stress increases by degrees.

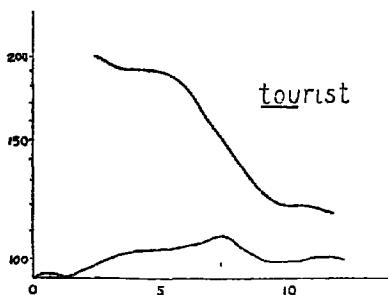


Fig. 22.

This type is very common among stressed syllables in English words of two syllables such as *foolish*, *sorrow*, *houses*, *toilet*, *clearly*, *fairly*, *tourist*, *before*, etc. A sense of instability is often felt when one hears a sound of this type.

In another type, the stress decreases at the same time that the pitch ascends. Such is rare in a word pronounced by itself, but is rather common in connected speech both in English and French. English *birthday* uttered by itself provides an example. In this case, though the stress diminishes, the pitch, on the contrary, rises with the result that the acoustic effect produced is of greater sonority. The end of an interrogative sentence mostly takes this form.

(iii) The pitch rises suddenly after the stress has considerably increased: e.g. Japanese *iro* [iɾo], *ine* [ine], *ai* [ái], *uni* [úni], *suzu* [suzú] *chizu* [tʃízu], *suji* [súdʒi], English *cup*, German *ob*, etc. A sound of this type gives an impression of "stop"—a feature in the "accented syllable" of the majority of dissyllables.

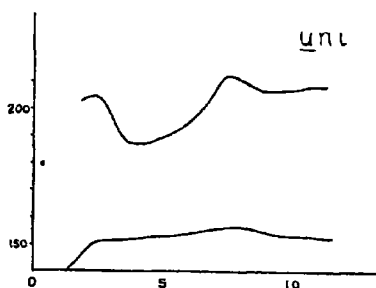


Fig. 23.

A similar feeling is given when the pitch rises from the beginning at the same time as the increase in stress: e.g. English *head, book, hook, box*, etc. The initial syllable in Spanish, Malay, etc. is analogous to this, only with a greater musical interval peculiar to them.

(iv) The pitch rises or falls according as the stress increases or decreases; and the curves are of mountain shape: e.g. English *knowledge, watch, gold, yacht*, German *Erde, Boden, löschen*, etc. This type gives an impression of "force", and is one of the formative elements of the (A₁)

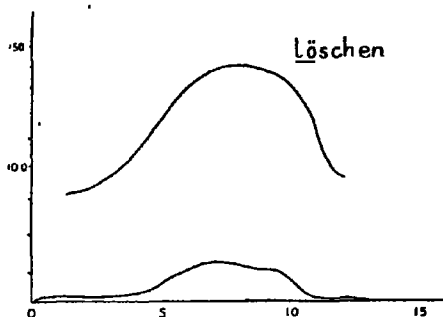


Fig. 24.

type accent mentioned in the previous section. In this type, however, notwithstanding that the range of the rising pitch amounts almost to a fifth and that of the falling pitch to a sixth, the pitch is not so prominent. Thus, the type is in striking contrast to the type (ii) shown in Fig. 22.

(v) The pitch-curves for long vowels and some diphthongs are apparently similar in shape to those for short vowels, but taking longer time to pronounce than the latter, the former produce different auditive impressions. To sum up:

(a) English *day, moor, chair, sorrow, star, chalk*, etc. when pronounced by themselves, exhibit curves of such form as illustrated in Fig. 25. A (upper) given on the next page.

(b) English *moon, noon*, etc. belong to B (middle).

(c) As is shown in C (below), the pitch-curve rises gradually, while

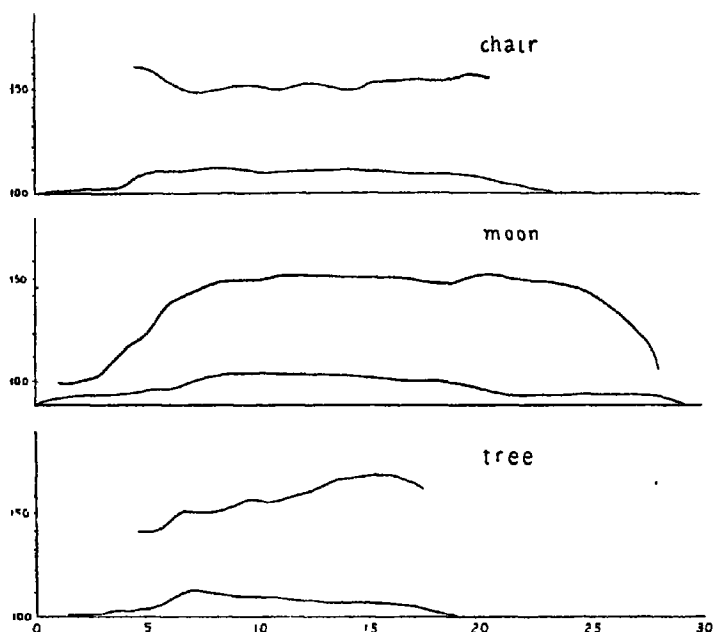


Fig. 25. A (upper), B (middle), C (below).

the stress either remains unchanged or slightly varies. Examples: English *tree*, *moon*, *eye*, *bag*; German *Vater*, etc.

Special attention is called to the fact that in the case of long vowels, a personal equation is apt to come in to a greater or lesser degree so that one and the same word may sometimes be of B and sometimes of C type.

Reference will not be made to the question of sound psychology in polysyllables. It suffices to say that the same applies here as in the case of monosyllables.

It will, however, be understood in outline when one compares the pitch and stress curves for various sounds mentioned in the next chapter with the ways of pronouncing those sounds. But all this will be explained later.

Lastly, a few words will be added as to how the variant degrees of pitch in speech-sound are represented. Generally the pitch is represented by means of musical notation on the staff. In this book, however, it is some-

times represented by means of intervals. And it should be noted that this is merely on the ground of convenience and differs a little from what is usually done in music.

Speaking generally, the pitch goes on by steps in music but continuously in speech-sound. While in the former the stress of a note either is immutable or varies only slowly, it changes quite abruptly in the latter. Even when the objective intervals of the pitch (between the rise and fall of the pitch) are the same, the subjective ones vary greatly according as the pitch is "gradational" or "continuous", or with the different degrees of rapidity in the change of pitch; or according as the pitch varies with the stress proportionately or inversely. For example, with German *Erde* and Malay *belot* the pitch is not so salient, notwithstanding the fact that the interval ranges from a fifth to a seventh. Where the stress and pitch run inversely to each other as in Japanese *bō*, even the rise of nearly an interval of a second or so in pitch is still distinctly audible. There is a considerable difference in the acoustic effect between a word in which the pitch stays constant while the stress varies along an undulating line and another in which the stress is constant while the pitch changes forming a curve of mountain shape (provided that in this case, the shift from rise to fall is made sufficiently quickly). It is with the latter, however, that the stress element is more dominant.

II. 3. Accent of Monosyllables.

In languages of the so-called "stress accent" type, we cannot distinguish forms of accent in monosyllables. For accent can be recognized only by comparing one syllable with another concerning their relative strength: e.g. we have to consider whether one is stronger or weaker than the other or whether the two are equal in strength. In case a word is pronounced by itself, it is difficult to tell whether the stress is in *diminuendo* or *crescendo* without any reference to pitch. With languages of pitch accent, on the other hand, whether the pitch is of rising, level or falling tone is easily distinguished even when a word is pronounced by itself not only in the case of the comparison of one syllable with another regarding pitch. This accounts for the possibility of accent on monosyllables of the "pitch accent" lan-

guages. What Dr. Sakuma calls "quasi-dissyllable"* in Japanese has undoubtedly this kind of accent. This quasi-dissyllable is often pronounced dissyllabically. In Japanese *hei* (soldier), *hō* (cannon), *jō* (emotion), *kyū* (nine), *lō* (cell), etc., there is a gradual fall in pitch, while in *hei* (enclosure), *hō* (law), *jō* (lock), *kyū* (urgent), *bō* (stick), etc., the pitch is either level or rises slightly. Though of course the difference between the two groups can readily be perceived, they differ but little in the rising and falling intervals and their degrees of inclination. In Chinese where the principle of "a syllable a word" is at work, recourse is had to the four types of accent i.e. "s fəŋ", which are different in pitch, in order that homophones (which are homonyms at the same time) may be distinguished. Any word of the language has invariably any of the four types of accent. They are fəŋ p'ɿŋ, ʃia p'ɿŋ, fəŋ fəŋ, and t'cy fəŋ. To denote each of these four types, a symbol [°] is added to one of the four corners of the written character for the word: e.g. fəŋ p'ɿŋ (lower left-hand; ʃia p'ɿŋ, (upper left-hand), fəŋ fəŋ (upper right-hand); t'cy fəŋ, (lower right-hand). The figures 1, 2, 3, 4 can be substituted for [°]. All this is exemplified: 發 [fa'], 訝 [fa'], 法 [fa'], 珪 [fa'].

The pitch and stress of the four sounds are represented in curves in Fig. 26. given on the next page:

fəŋ p'ɿŋ is of quite level tone, the pitch and stress of which stay immutable. ʃia p'ɿŋ is a short and precipitous sound like that uttered in questions, its peculiarity being a sudden rise in pitch. With fəŋ fəŋ, the pitch ascends gently at first and rises sharply finally, while the stress is slightly on the increase both initially and finally. On the other hand, t'cy fəŋ falls quite abruptly in pitch and ends almost inaudibly, taking a shorter time in pronunciation. Besides the foregoing, words used in connection with the study of "s fəŋ" are: 難 [tɕi'] 急 [tɕi'] 幾 [tɕi'] 記 [tɕi']. But the pitch-curve is almost identical with that for [fa], and is very regular. A little difference is noted, however, in the stress-curve.

Chinese is essentially a language with the principle of "a syllable a word" as already described, but sometimes dissyllables or tri- or quadri-syllables are formed from monosyllables. In such a case, the accent of each element remains the same as before. Accordingly, if a

* See Dr K Sakuma. "Pronunciation of Japanese," pp 389-395

monosyllable has four different types of accent, sixteen different combinations are possible with a dissyllable consisting of two such monosyllables.

Examples:

花生[hua¹ ʃəŋ¹] 花眉[hua¹ mei²] 花子[hua¹ t'sau²] 花樣[hua¹ iaŋ²]
 毛窩[mau² uo²] 毛錢[mau² t'çien²] 毛女[mau² ny²] 毛布[mau² pu²]
 長班[tʃəŋ³ pan¹] 長隨[tʃəŋ³ sui²] 掌尺[tʃəŋ³ t'ʃ²] 長大[tʃəŋ³ ta¹]
 地方[ti¹ ʃəŋ²] 地龍[ti¹ luŋ²] 地板[ti¹ pan²] 地動[ti¹ tuŋ²]

Forms of accent can also be distinguished when a Japanese monosyllable consisting of a short vowel is followed by *joshi* (auxiliary particle), though not if pronounced by itself. For instance, *e*, if pronounced separately, may stand either for *e* (picture), or *e* (handle), but *eo* stands no doubt for the former not the latter. *e* (handle), *ki* (mind), *ha* (leaf), *na* (name) are lower in pitch than the subsequent particle, while *e* (picture), *ki* (tree), *ha* (tooth), *na* (vegetable) are higher.

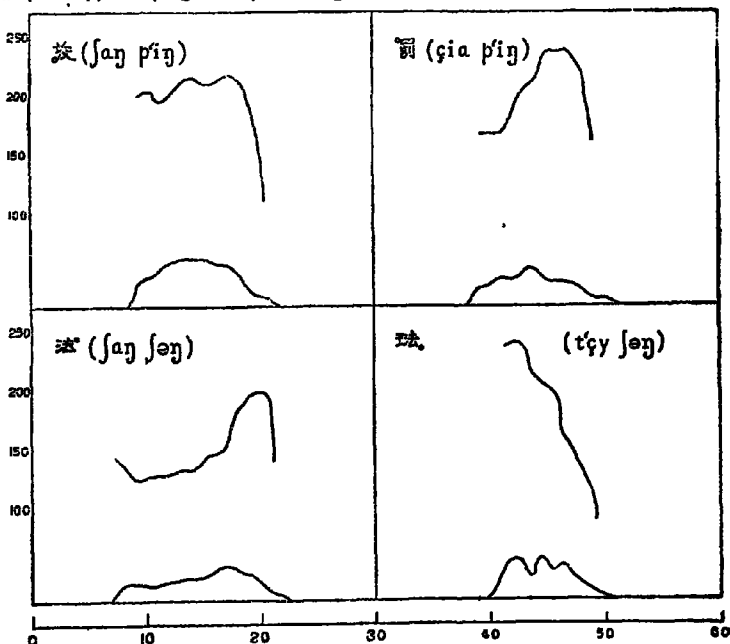


Fig. 26.

CHAPTER III

TONAL PECULIARITIES OF VARIOUS LANGUAGES

III. 1. Kinds of Accent and Languages.

With regard to the languages used as data in the preceding chapter, the types of accent or pitch and stress may be divided into the four groups given below :

- (i) The so-called "stress accent" that denotes the constancy of the relative stress within a word—e.g. English, German ;
- (ii) The so-called "pitch accent" that denotes the immutability of the relative pitch in a word—e.g. Japanese, Chinese, Korean, Mongolian ;
- (iii) All the words of a given language belonging to this group have a pitch-curve of the same type—e.g. Malay, Hindustani ;
- (iv) All the words of a given language, in which not only the pitch but also the stress are more or less of the same type—e.g. Spanish.

Of these, (iii) and (iv) have resulted from the classification on the basis of registered sound waves. It is, therefore, not evident whether the words have invariably the same type of accent whatever their positions may be in a sentence. This is true at least from the data collected so far. Since, however, these words exhibit, without a single exception, a striking feature that distinguishes them from those of other languages, it follows that the accent of their languages differs much in nature from that of other languages.

Accordingly, we learn there is yet another type of accent somewhat different from the so-called pitch or stress accent. It may also be noted that there are varieties even in the pitch or stress accent itself.

When the first syllable has a rising tone whereas the second has a falling pitch, as in Malay and Korean, the two will be felt equally strong provided that the pitch intervals (rising & falling intervals) and the *tempo* are great and equal. In pronouncing these words, often we cannot decide readily which of the two syllables is really stressed (stronger). That rise and fall in pitch effect psychological impres-

sions which, though equal in quantity, are yet different in quality is too self-evident to be repeated.

III. 2. Elements in the Formation of the Word.

Prior to the discussion on the substance of the subject, it is necessary to consider how the speech material, as one of the elements in the formation of speech, and the rest of the elements vary with different languages.

In the preceding chapter, it has been explained that there are many types of accent in words as speech material. The question will be treated in this chapter as to what tonal arrangements we shall have when a connected speech is formed by words.

The following five can be named as elements in the formation of connected speech:

- (i) Words as speech material;
- (ii) Usage prescribing the relative importance of words (i.e. stress), syntactical pattern, rhythm, etc. best suited to the circumstances;
- (iii) Contents to be expressed;
- (iv) Style;
- (v) Tone (speech tone).

These are components of any connected speech.

From the nature of this experiment, a somewhat minute study will be made on (i) later. The second element is, like the first, yet another element of speech material. By "contents" in the third item is meant the thought or emotion that the speaker wishes to convey or express. The fourth element "style" means a mode of expression; it may be descriptive, declamatory, theatrical, recitative or conversational. The difference in styles can be said to depend very largely on the degrees of exaggeration and intonation. By means of the fifth element, speech is given various phases of mood, very delicately formed: e.g. a heavy tone, a frivolous tone, a cheery tone, a gloomy tone, a calm tone, a violent tone, etc. Though it seems that the time element plays an important part in the change of tone, the study of this subject will be reserved for the future.

Now I shall give in tabular form those phases of speech material which are important in some respects or other in determining the tonal pecu-

liarity of a language.

(i) Kinds of speech-sound:

(a) vowels and consonants;

(b) languages of long vowels; those of short vowels; those in which both kinds of vowels are of equal importance;

(c) consonants which are pronounced by themselves; consonants which are invariably followed by a vowel.

(ii) Construction of Syllables:

(a) languages whose words are all monosyllables; those whose words are largely dissyllables; those in which both monosyllables and polysyllables are possible;

(b) a polysyllabic language which has the centre of stress on a certain syllable; or one in which each syllable is of equal value.

(c) each syllable is pronounced separately or successively.

(iii) Kinds of Accent:

(a) fixed accent, flexible accent;

(b) pitch accent, stress accent;

(c) in the case of the stress or pitch accent, the initial syllable is stressed or high-pitched; the final syllable is stronger in stress or higher in pitch.

With a language that has a stress accent, the distribution of stress over a word once determined, the pitch may freely vary. On the other hand, with one that has a pitch accent it is the stress that may freely change while the pitch remains constant. But in such cases, how does the difference in accent appear in the resulting speech-sound? Or how does it come to be when the accent interferes with the tone (for instance, when at the close of an interrogative sentence a word comes that ends in a syllable with a low accent)? The answers to these questions will gradually come to be understood in the course of the following explanation.

As has already been explained, speech is made up of the five elements, i.e. speech material, usage, contents, style and tone. A study will be made hereunder of the tonal peculiarities of nine languages, viz. English, German, French, Japanese, Chinese, Korean, Hindustani, Russian and Mongolian, chiefly concerning the first two of these five elements.

III. 3. English.

The three English descriptive sentences used as data are given below.

The speaker of the first is Sir Francis Lindley, former British Ambassador to Japan, and of the second and third, Mr. W. E. Harris, sometime Lecturer in English in the Tokyo School of Foreign Languages.

1. *It has been often said that books do for us to-day what universities did in earlier ages The knowledge that could, five centuries ago, have been obtained only from the lips of a teacher can now be gathered from the printed page.*

2. *I will give you a red flower.*

3. *I will give you a flower which I plucked on the hill at the back.*

Fig. 27. on the next page has been obtained, after a strict measurement, by the representation in curves of the pitch and stress as registered on an oscillogram.

(a) Sentence 1. will first be treated.

As has already been explained, in a dissyllable uttered by itself, the pitch interval of the two syllables is a fifth on an average with an average stress ratio of 2.6; the figures varying but little with different words. The ratio of stress, however, undergoes modification in connected speech by the intonation. Speaking generally, the order of stress is not normally subject to change, even if the ratio of stress varies among syllables of a word. The change in the order of stress takes place now and then in a polysyllable with almost level accent. (A wonderful example is *everybody*.) The ratio of stress between the strongest and the next strongest syllables in the words of two and more than two syllables of sentence 1 are given in parentheses as follows:

often (3.6), *to-day* (5), *universities* (2), *earlier* (1), *ages* (12), *knowledge* (2.5), *centuries* (5), *ago* (5), *obtained* (4), *only* (3), *teacher* (1), *gathered* (2), *printed* (1), *page* (-).

Probably, it is due not so much to the intonation as to the intrinsic quality of the word itself that the stress ratio varies so much with different words. The stress of *flower* in sentences 2 and 3, however, varies considerably according to position.

(b) The words *it*, *that*, *the*, *a*, *from*, etc. are weaker than others.

(c) As is evident from the diagram, by piecing together the fragmentary small curves, one continuous and moderately undulating wave-line will appear. The resulting pitch-curve goes on quite smoothly, almost independently of the stress. This constitutes one of the characteristic

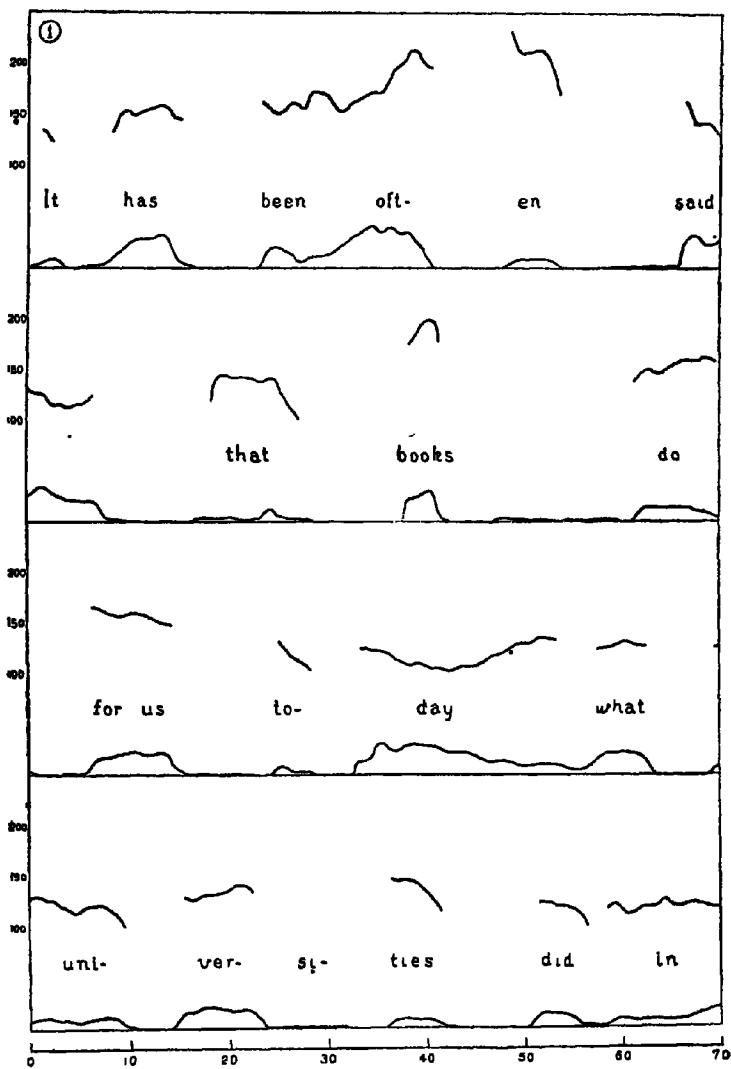


Fig. 27—1.

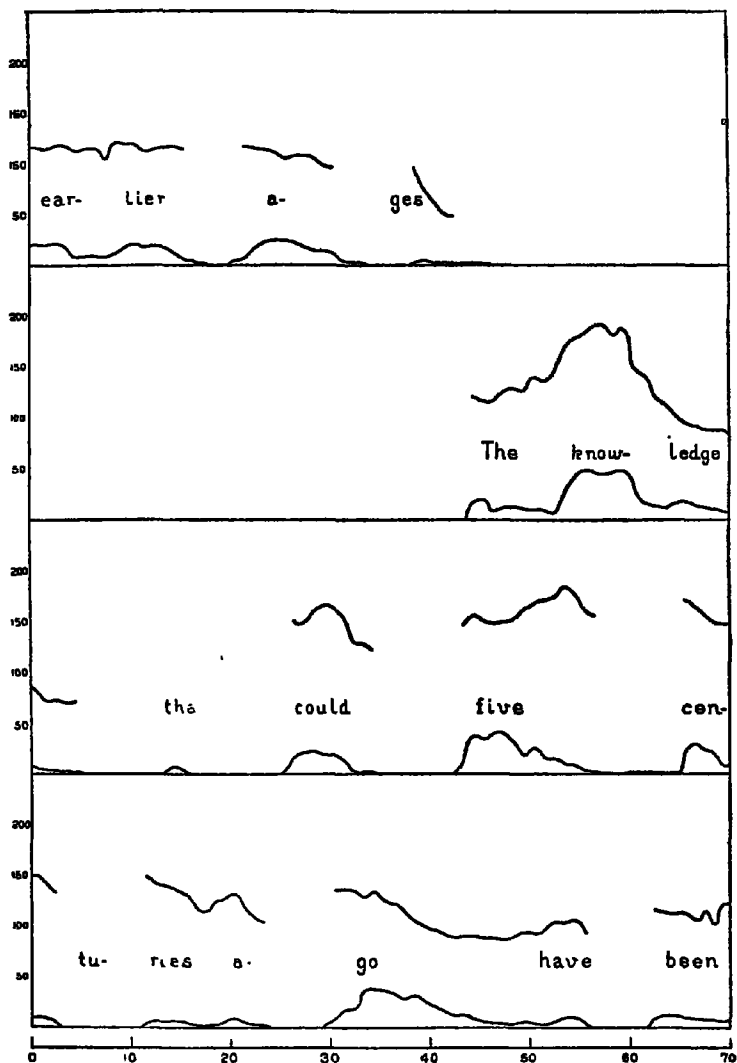


Fig. 27.—2.

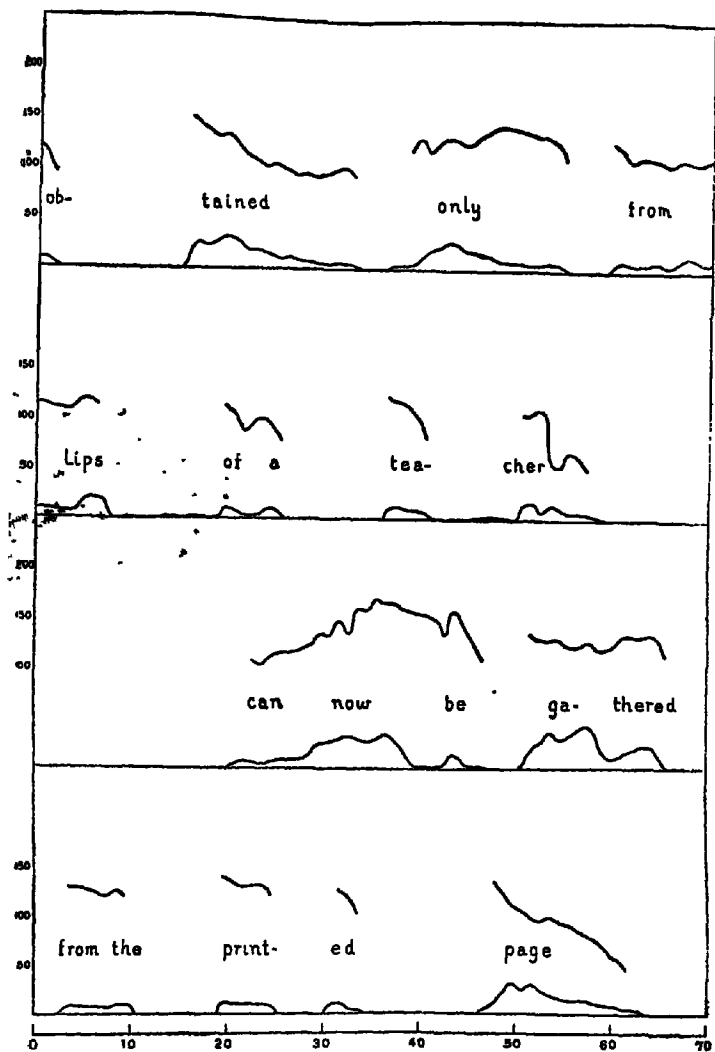


Fig. 27.—3.

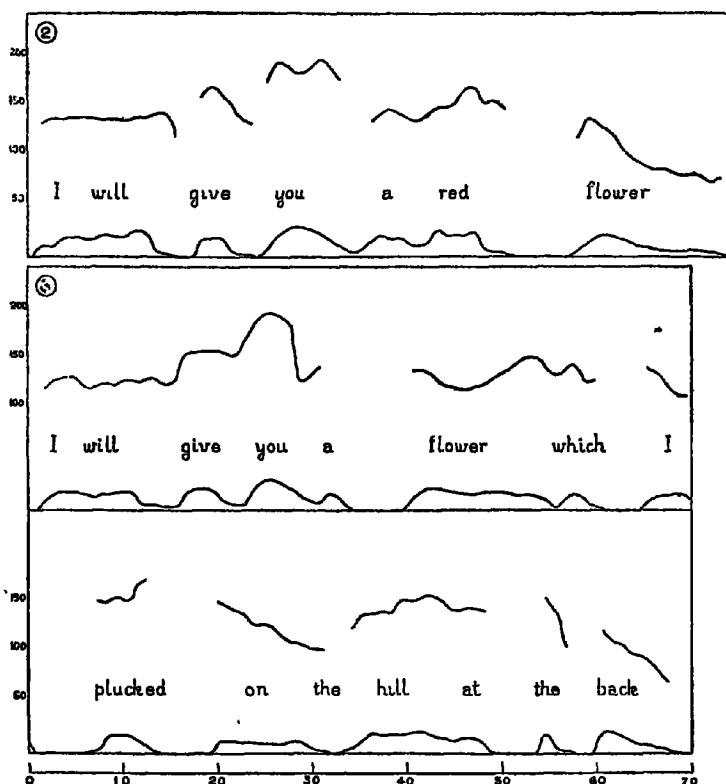


Fig. 27—4.

features of the English language. In this sentence, *books* and *could* alone are not on the curve. Every bit of the wave-line is complete in meaning. At the points of special importance in the sentence, the curve makes greater undulations and toward the end it either becomes of level tone (*did in earlier ages*) or shows a succession of short falling tones (*teacher, printed, page*).

(d) By dividing the wave-line shown above into several breath-groups, a study will be made of the pitch and stress in each group.

First of all, in (1) *It has been often said*, the pitch is comparatively high from the beginning and reaches its highest point with *often*, and after that begins to descend ending in *said*. The last named is pro-

nounced with an ordinary pitch. The stress too is, on the whole, strong. In (2) *that books do for us to-day*, both pitch and stress decrease. But after *that* comes *books* (strong and high) which is followed in turn by *do for us to-day* (less high-pitched) after an appreciable lapse of time. Little variation is observed in pitch in (3) *what universities*. The pitch is lower still in (4) *did in earlier ages*. The change in pitch may be illustrated briefly as follows:

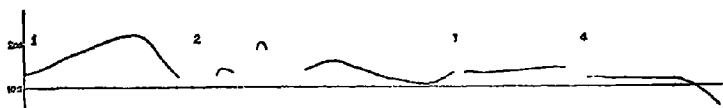


Fig. 28.

The pitch is higher in (1) and *books* of (2). The close of the sentence is indicated by the fact that (4) is lower in pitch than (3). The stress remains fairly strong throughout (1); in (2), *books* is prominently stressed, and (3) and (4) are both weaker. In (5) *The knowledge that could five centuries ago*, *knowledge* is stressed and high-pitched being at a peak of the pitch. *Could* and *five centuries ago* have peaks of their own, that of the latter being situated between *five* and *centuries*. As a whole, (5) is high. The change in pitch is scarcely perceptible in (6) *have been obtained only from lips of a teacher*. In (7) *can now be gathered from the printed page*, *can now be* makes a rise with *now* at the height. The pitch is ordinary in *gathered from the printed page*, so also is the stress. (5), (6) and (7) may be summed up in the following diagram drawn to scale.



Fig. 29.

In sentences 2 and 3 the same relations exist between pitch and stress as in 1. But in 3, the wave is of the shorter cycle than in 1.

III. 4. German.

(Materials for the experiment are from the nine sentences given on page 42, the speaker being Mr. M. Netke, Lecturer in the Tokyo School of Foreign Languages.)

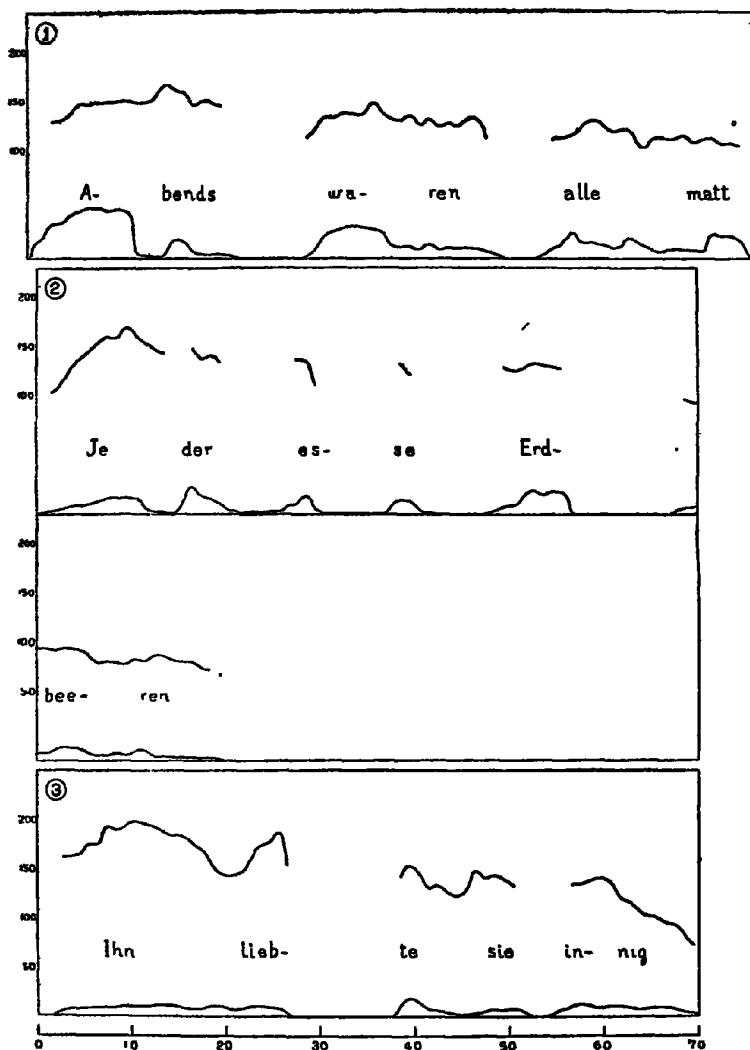


Fig. 30—1.

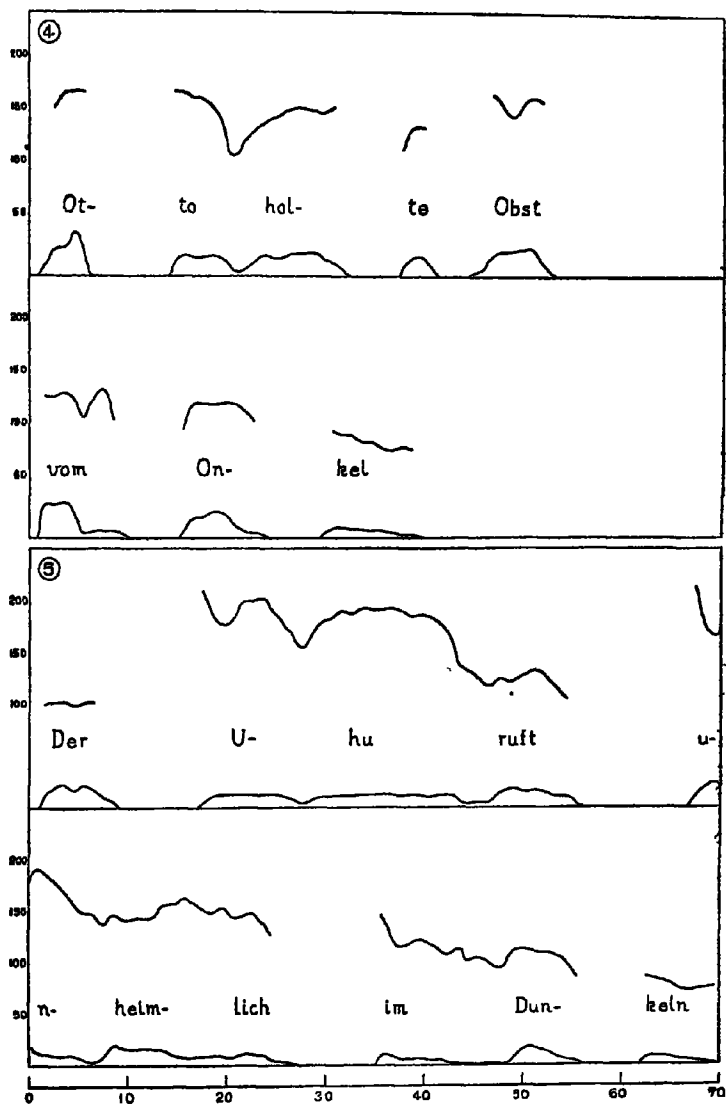


Fig. 30—2.

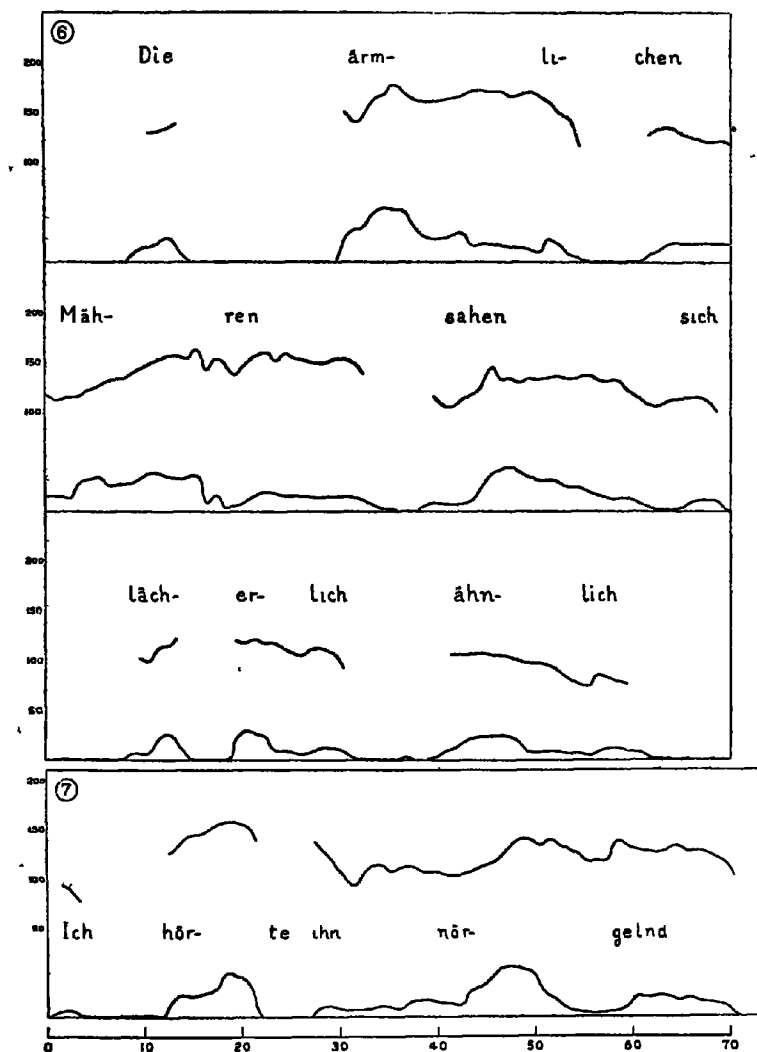


Fig. 30—3.

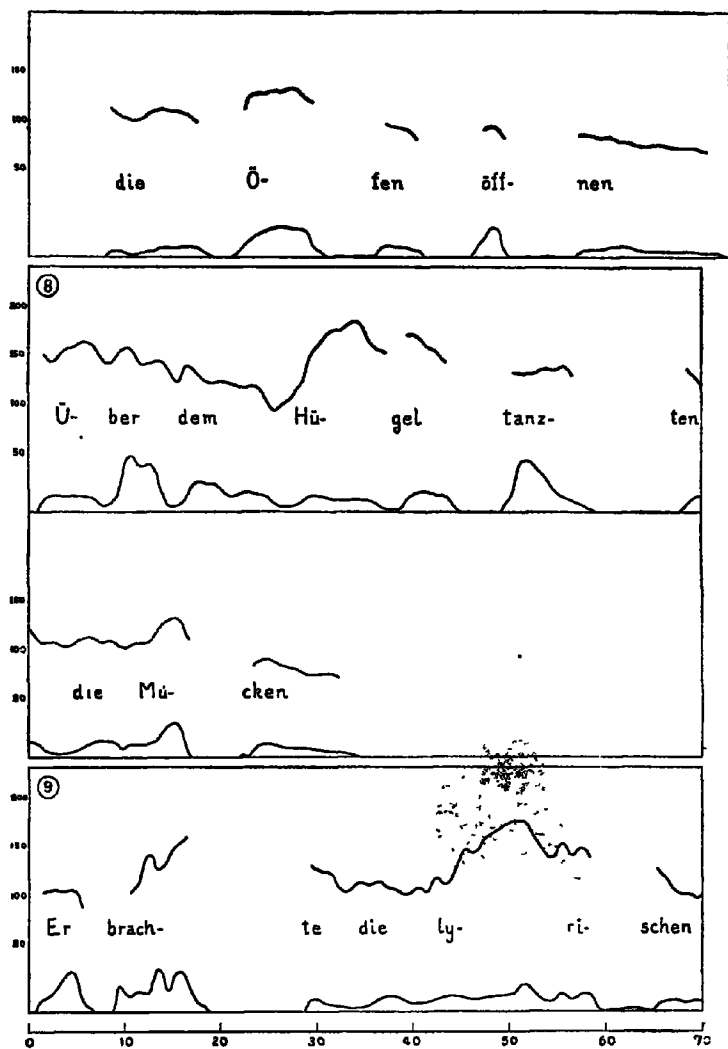


Fig. 80—4.

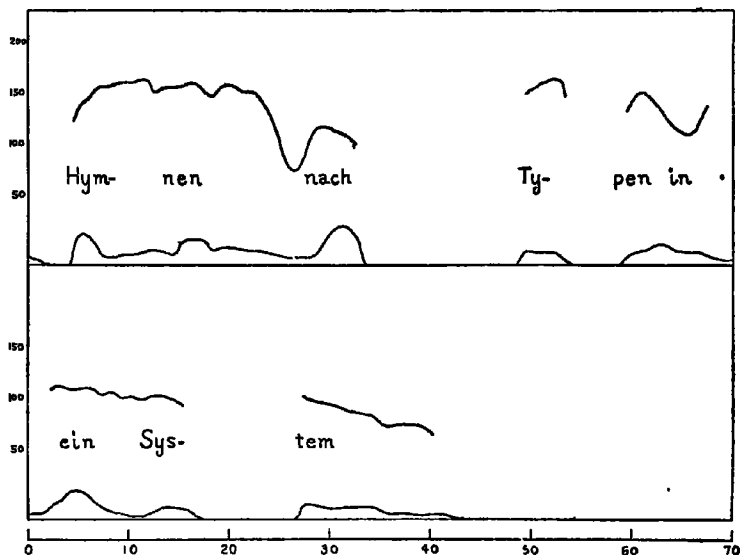


Fig. 30—5.

1. *Abends waren alle matt.*
2. *Jeder esse Erdbeeren.*
3. *Ihn liebte sie innig.*
4. *Otto holte Obst vom Onkel.*
5. *Der Uhu ruft unheimlich im Dunkeln.*
6. *Die armlichen Mahren sahen sich lächerlich ähnlich.*
7. *Ich horte ihn norgelnd die Öfen öffnen.*
8. *Über den Hügel tanzten die Mücken*
9. *Er brachte die lyrischen Hymnen nach Typen ein System.*

The pitch and stress as recorded on the oscillogram are represented by curves in Fig. 30 (1—5) on the preceding pages. (The figures in parentheses given below stand for the numbers of the above sentences).

From this, it may be noted that most dissyllables (numbering 22) in these short sentences are stressed on the first syllable. In pitch, they are either higher initially or level. In both *innig* (3) and *holte* (4), the two syllables have equal stress, and the pitch is higher on the initial syllable. On the other hand, in *jeder* (2), *liebte* (3), *über* (8), *Hügel*

(8), the initial syllable is weaker, higher and longer: viz. the so-called "betonte Silbe" with a close vowel is weakened. It seems that with these words, the initial syllable can be pronounced more strongly but lower, and the last more weakly yet higher without the proper accent of the word being much impaired. But it is not permissible to utter the word in such a way as to make the final syllable both higher and stronger. Accordingly, in this case the pitch can be or has been substituted for the stress.

The foregoing German sentences have been chosen with a view to the analytic measurement of the German vowels. Correspondingly in the following will be treated the pitch and stress as registered on the osillogram of the materials gathered this time for the purpose of studying intonation (the speaker being the same as in the former).

- 1'. *Horten Sie gestern abend den Uhu rufen?*
- 2' *Nein, ich habe nichts gehört*
- 3'. *Ja, waren Sie denn gestern nicht hier?*
- 4' *Ja, ich bin nicht fort gewesen*
- 5'. *Nein? Und Sie horten nicht den dunkeln Ruf?*
- 6'. *Ja, denn habe ich gehört*
- 7'. *Ja, das war der Uhu*

In the above sentences, each of the words *hörten*, *gestern*, *habe*, *gehört*, *Uhu* occurs twice. (The pitch and stress curves of the sentences have been omitted.) Except in the case of *Uhu*, they are very much like one another in their stress-curves; the pitch-curve is level with *habe*, and with *gehört*, it falls in *ge-* and has a rise-fall in *-hört*. In each case, the peculiarity is comparatively well retained. With *gestern*, however, it is a little different. The word is high pitched on the first syllable in the sentence 1' and is low pitched on the last in 5'. The curve, in each case, has a rise in the forepart and a fall in the final portion. Consequently, the accent of German may be described as "stress accent", and is more immobile as compared with that of the English language.

The ratio of stress in the dissyllables and trisyllables contained in the foregoing German sentences will be given below in order to show the immutability of stress accent (the ratio for the trisyllables being that be-

tween the strongest syllable and next strongest).

1. *abends* (27), *waren* (23), *alle* (13).
2. *jeder* (-), *esse* (1.3), *Erdbeeren* (13)
3. *liebte* (-), *innig* (1.2).
4. *Otto* (21), *holte* (11), *Onkel* (43).
5. *Uhu* (10), *unheimlich* (12), *Dunkeln* (23).
6. *armlichen* (18), *Mahren* (19), *sähen* (20), *ähnlich* (2.0), *lacherlich* (13 15 6).
7. *Norgelnd* (26), *Ofen* (30), *offnen* (3.0)
8. *über* (-), *Hugel* (-), *tanzen* (32), *Mücken* (2.9).
9. *brachte* (37), *lyrischen* (14.9:6), *Hymnen* (1.3), *Typen* (-), *System* (1.4).
- 1'. *horten* (50), *gestern* (16), *abend* (16), *Uhu* (1.5), *rufen* (2.0).
- 2'. *habe* (20), *gehört* (1.4).
- 3'. *waren* (19), *gestern* (18).
- 4' *gewesen* (20).
- 5' *horten* (46), *dunkeln* (11).
- 6'. *habe* (17), *gehört* (14).
- 7'. *Uhu* (26).

Of the ratios given above, the greatest is 5.0 and the smallest 1.0, the average being 2.1. The last figure is larger than the average of 1.4 for the words said in isolation. The difference is due not so much to the variations in intonation as to the differing qualities of the words. A glance at the pitch-curve of German tells us that a sudden fall in pitch is immediately followed by a sudden rise. When repeated in a sentence, this gives rise to a kind of rhythm. Sentence 4 furnishes a typical example. This peculiarity perhaps results from the fact that the German words are so pronounced as to bear stress on the first syllable. That such a characteristic feature is in accordance with the German usage is clear from the existence of a similar phenomenon in the monosyllables. Examples: *ihn liebte* (3), *liebte sie* (3), *Obst vom* (4), *ihn n̄r-gelnd* (7), *Hymnen nach* (9), *Typen ein* (9).

In English, the pitch-wave is either of long or short cycle, and is complete in itself or becomes a small centre in a sentence. The case is slightly different with German rhythm. Both in English and German, the pitch does not rise toward the end of a sentence (when the sentence

is descriptive), but is in general level or falling. Again, in English, the stress is diminished rather quickly in final positions of words, while in German both the pitch and stress decrease more gradually.

III. 5. French.

The following five sentences have been chosen as material for the descriptive style of French speech. The speakers are Messrs M. F. Nouet, M. M. Chabas, and M. Mott for 1, 2; 3, 4; and 5 respectively.

1. *Papa va à Paris.*
2. *Le fer a été chauffé dans le foyer.*
3. *On a battu un mâtin pour avoir couru dans les fleurs des deux corbeilles.*
4. *La France fut un royaume de monarchie absolue jusqu'à la révolution de 1789 (dix-sept cent quatre-vingt-neuf) pour être aujourd'hui une République*
5. *La misère d'un pauvre enfant C'est dans cette étroite et sombre rue de Périquex, où nous demeurions alors, que je devais éprouver l'irréparable malheur de ma vie.*

The pitch and stress of these sentences as recorded on the oscillogram are represented by curves on the following pages:

a) First of all, the stress-curve will be studied. In a group (consisting) of several syllables, the difference in stress is only small between neighbouring syllables. When it is great, that denotes a considerable space of time intervening. By linking together the peaks of the stress-curves of the syllables, a smooth curve may be obtained. A part of the stress-curve of *jusqu'à la révolution* is illustrated in Fig. 32.

The curve takes various kinds of forms besides those of mountain shape given in the diagram. These are either level or have a gradual rise or fall. In Fig. 33 are illustrated the stress-curves of sentences 3, 4, 5 and their curves obtained by piecing together and getting rid of irregular indentations of the smaller fragmentary curves.

b) French is said to be a language with "stress accent" where the final syllable is stressed more than any others. In connection with this, interesting phenomena have been noted. French has a peculiar system of tone: the pitch element of words forming a sentence is determined according to their position in the sentence (by this is not meant, however, that the

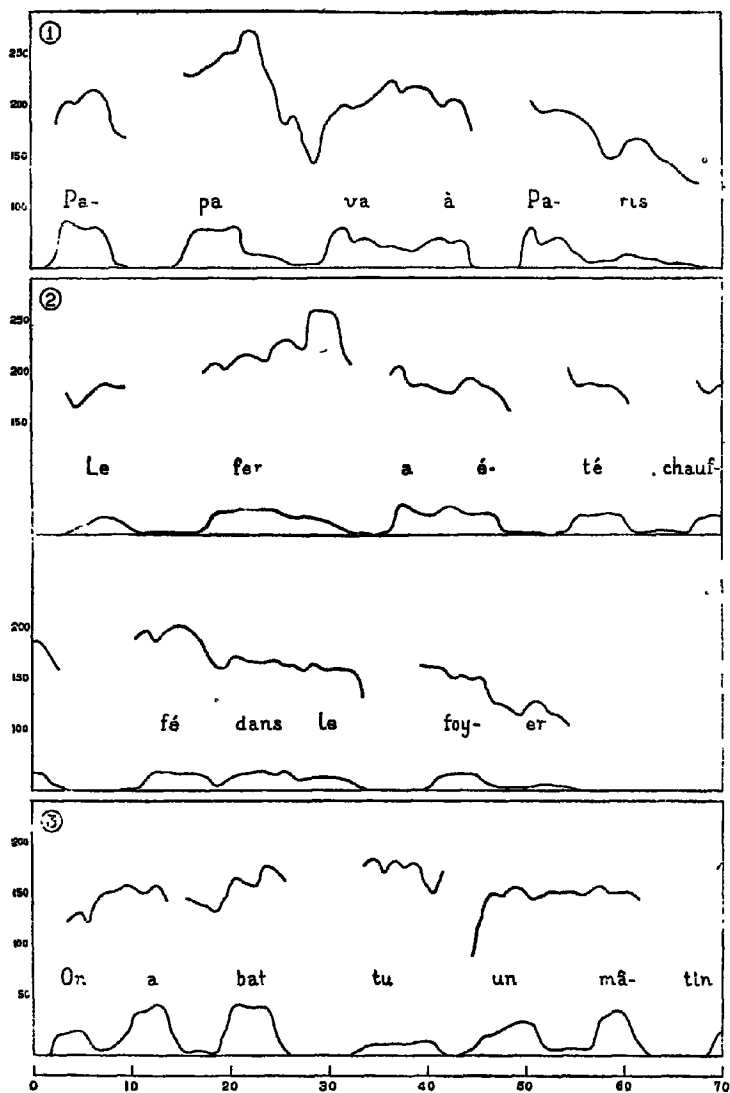


Fig. 31-1.

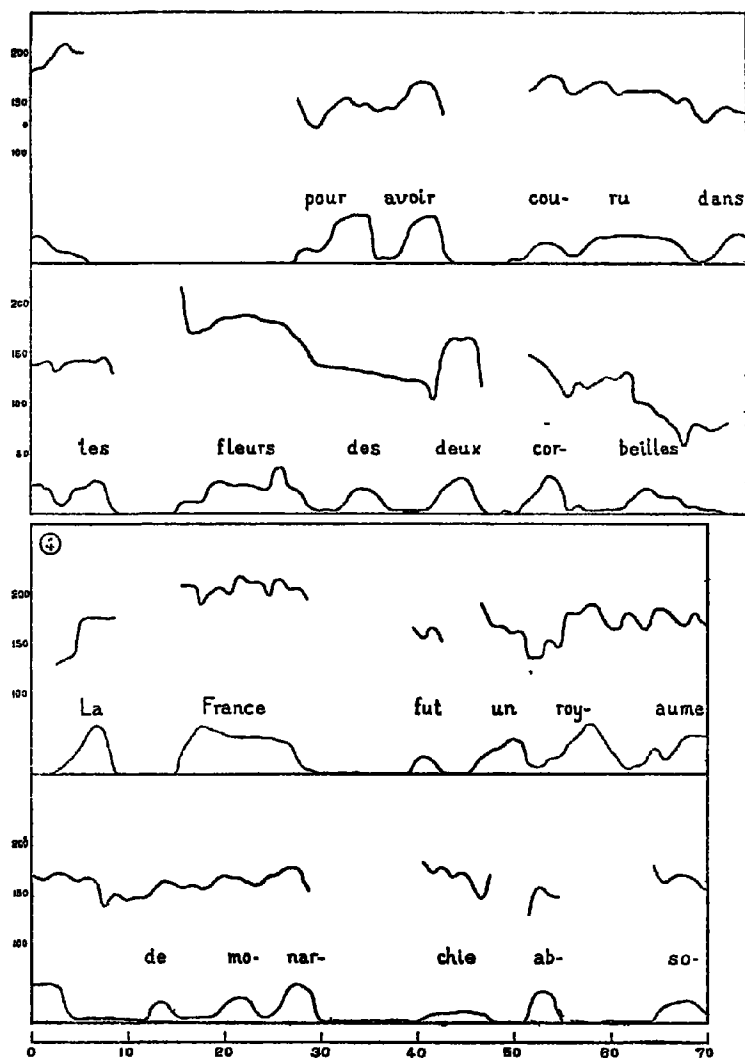


Fig. 31—2.

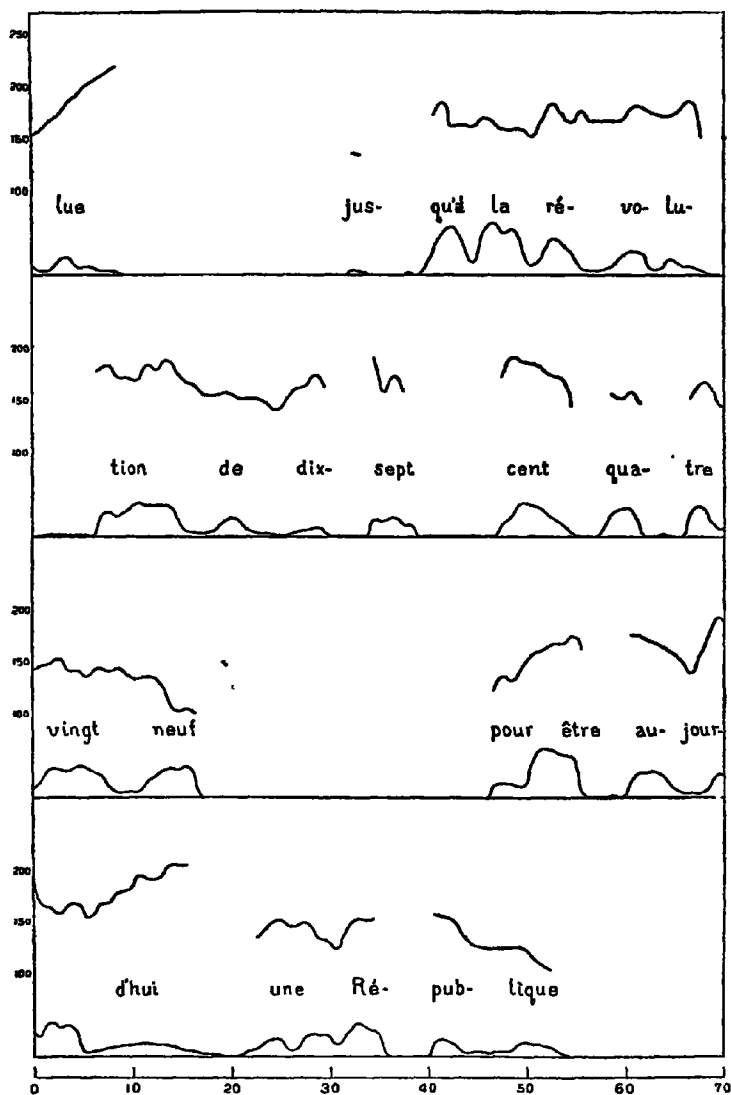


Fig. 31—3.

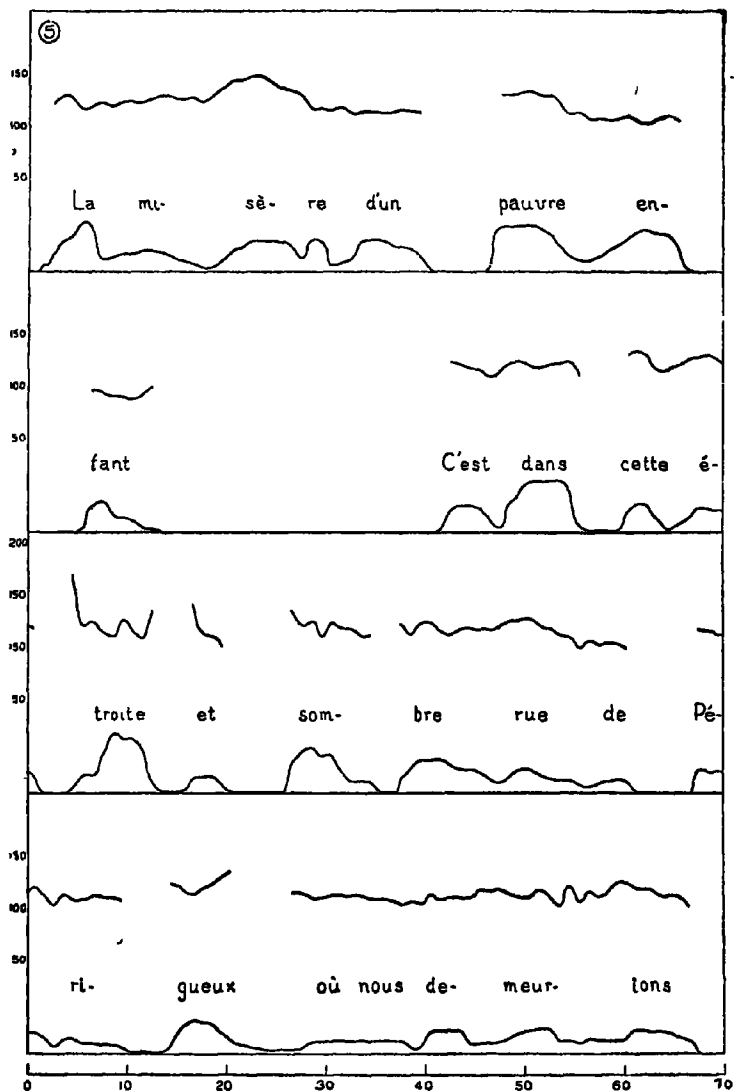


Fig. 31—4.

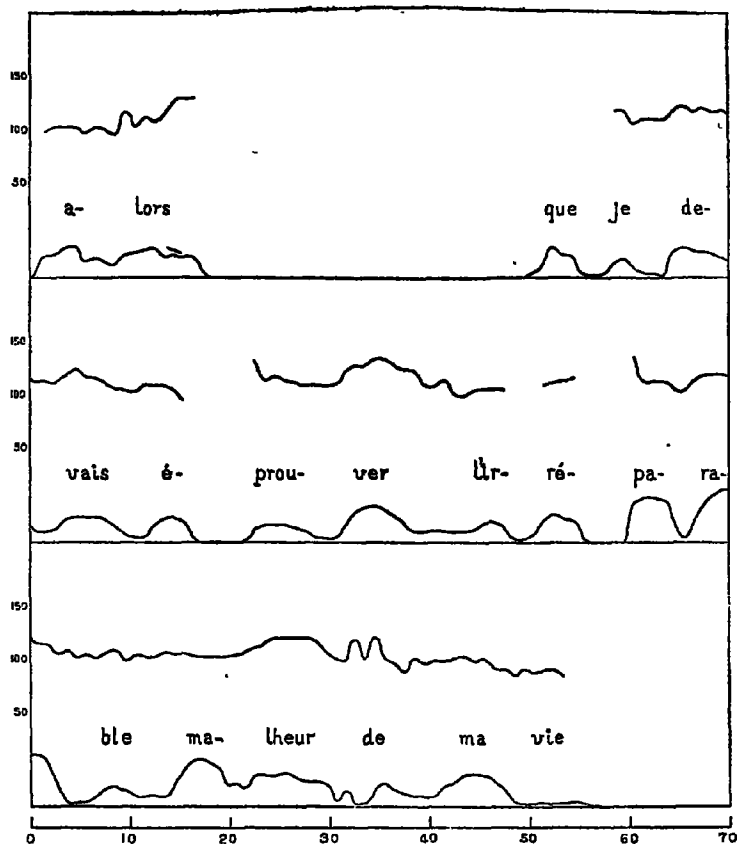


Fig. 31—5.

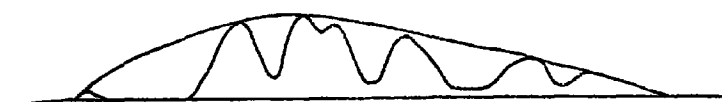


Fig. 32.

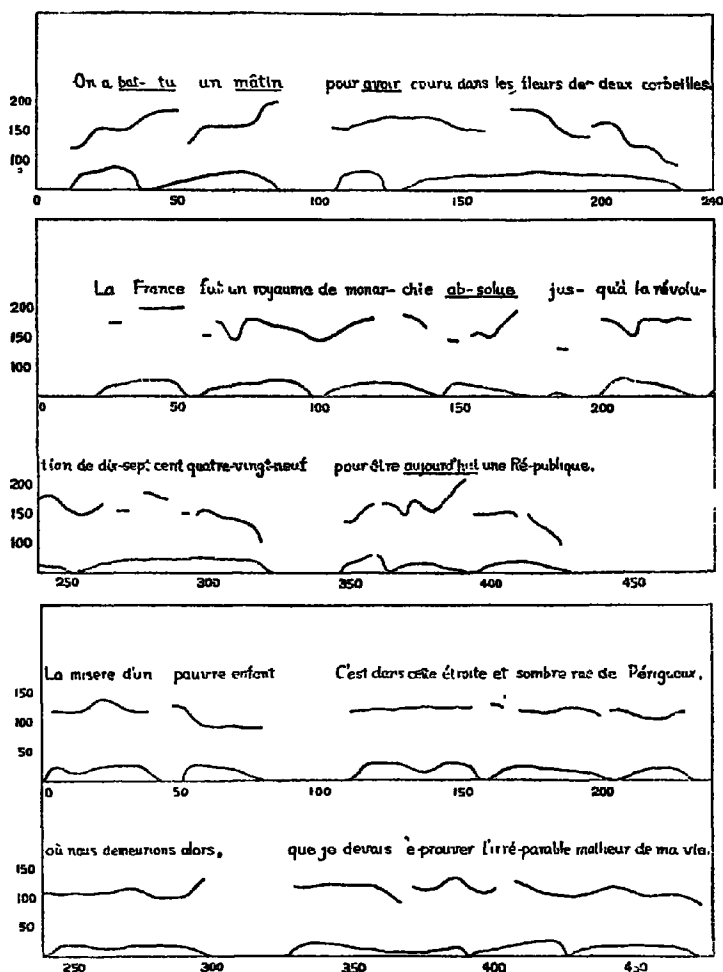


Fig. 33.

stress is free from such restrictions.) For instance, when the subject beginning a sentence is either a word of more than two syllables or preceded by an article, it (e.g. *fer*, *France*), or its final syllable (e.g. *-pa*, *-sère*) becomes higher as in *papa* (1), *le fer* (2), *la France* (4), *la misère* (5), etc. Again, when a continuation is implied as in *on a battu* (3), *un*

mâtin (3), the pitch-curve has a terminal rise—a feature also characteristic of the tone system of the language.

As has been previously explained in the section on sound psychology, the rise in pitch is heard more prominently when the pitch and stress run inversely. It is perhaps for this reason that the last syllable of words in a sentence with rising tone becomes higher, weaker and longer. To draw special attention to this fact the words are underscored in Fig. 33. (*battu*(3), *mâtin* (3), *avoir* (3) *absolue* (4) *aujourd'hui* (4)).

Even the last syllable of words with rising tone may sometimes be stressed more than a preceding syllable, provided that it ends in a long vowel. For example, in *Périgueux*, *-gueux* is stronger than *Péri-*. But as far as *-gueux* is concerned, it becomes not only higher but weaker. When a sentence is approximately level in tone and the last syllable of the words is not very high-pitched, the two syllables are almost equal in stress. The last syllable becomes stronger as in *couru* (3), and *étroite* (5), when the sentence is of level or falling tone.

Cases in which the pitch varies in inverse proportion to the stress are not confined to the above examples, as is instanced in the syllables that together make up a word. Examples: *cor-*, *-gueux* in *corbeilles* (3), *Périgueux* (5); the trisyllabic *évolu-* in *révolution*.

But at the same time the pitch and stress often vary not inversely. In *royaume* (4), both pitch and stress decrease and similarly *monarchie* is stressed on the first syllable with *-chie* being slightly higher. In *demeurations* and *alors* in the sentence 5, the stress remains unchanged and the pitch is level in the former and rising in the latter. *Ré-*, *-tion* in *révolution* (4) are both stressed and the word as a whole has a rising tone, while in *jusqu'à*, the final syllable is stronger and higher. In *misère*, *éprouver* (5), the pitch and stress increase in the final syllable; and in *malheur* (5) the corresponding syllable is higher though not strong. The pitch and stress are in proportion in these three words, for they are located in a sentence in those positions in which the rise does not take place.

c) In English and German, languages of the stress accent type, the pitch and stress decrease only by degrees when the sentence ends in a word with weak stress on the last syllable. In French, on the contrary,

as is shown in *Paris* (1), *foyer* (2), *corbeilles* (3), etc., the pitch falls only after having once risen. And the stress is weaker on the last syllable which is longer instead.

These observations reveal that French is different in character from English and German. Whether French with such peculiarities is a pitch accent or stress accent language, or belongs to neither of the two categories will be dealt with in the next chapter.

III. 6. Japanese.

Of the following sixteen Japanese sentences used as data, the first twelve are descriptive.

1. *E o kaku; Enogu o tsukau*
(to draw a picture; to use colours.)
2. *Shōyūki na hito da*
(He is an honest man.)
3. *Eigo mo manabimasu*
(I learn English as well.)
4. *Kasukani mieru.*
(I can see it vaguely.)
5. *Seikatsu no tameni.*
(for the sake of living.)
6. *Seitai ga koe no moto desu*
(The vocal cords are the source of the voice.)
7. *Boku wa mareigo no gakusei desu*
(I am a student of Malay.)
8. *Boku wa Kakei-kun no sōbetsukai ni shusseki shimasu.*
(I shall come to a farewell meeting to Mr. Kakei.)
9. *Kinō Meijingu ni sanpai shimashita*
(Yesterday, I went to the Meiji Shrine to pray.)
10. *Ano hito wa nyūgakushiken ni shūbiyoku kyūdai suru rashī.*
(He is very likely to pass in the entrance examination with great success.)
11. *Anata ni akai hana o agemashō.*
(I shall give you a red flower.)
12. *Anata ni kesa urayama de totta hana o agemashō.*
(I shall give you a flower which I plucked on the hill behind the house.)

The following sentences are emphatic with the exception of No. 16, which is interrogative.

13. *Hanaga kireida.*

(The flower is pretty.)

14. *Kireinanowa hanada.*

(Pretty is a flower.) or (A flower is a pretty thing.)

15. *Sotsugyōshiki o shikusu.*

(I congratulate you on your graduation ceremony.)

16. *Haru? Aki?*

(Spring? Autumn?)

The descriptive sentences (1-12) have similar pitch and stress curves. The pitch-stress-time curves of Nos. 6, 7, 8, 10 and 12 may be given, as these sentences have more or less characteristic features and variant types of accent.

(A) The descriptive style of Japanese speech has a very simple form, and as is shown in the diagram on pp. 56-57, the stress gradually decreases from the beginning to the end or remains almost the same. Throughout the sentence, there may be observed only a slight change in its tone (the partial average of pitch). In Fig. 34. are illustrated disyllables and polysyllables such as *koe*, *boku*, *hana*, *Mareigo*, *gakusei*, *Kakei*, *sōbetsukai*, *shusseki*, *anohito*, *nyūgakushiken*, *shubuyoku*, *kyūdai*, *anata*, *kesa*, *urayama* etc. Little difference, however, is perceptible in pitch variation, as characterised by accent.

(B) A few words have previously been given as examples to show characteristic features of the Japanese language. Further investigation of other speech material, i.e. of words pronounced separately or in connected speech, reveals a peculiarity unknown to any language with stress accent. In order to represent accent in Japanese*, it has been customary to draw lines (in vertical passages) on both sides of or above and below (when written literally) a letter. In this way the relative pitch between syllables may be known. It should be noted, however, that this is purely on the ground of convenience and that we have here only a subjective

* See Dr K Sakuma "Pronunciation of Japanese," p. 406; "Pronunciation and Accent of Japanese," p 161.

representation of pitch. In fact, this system of representation is not so designed as to denote that the pitch varies in gradation. This is because in most Japanese words, the pitch shifts from one syllable to another, either quite smoothly as in *obāsan* or quite abruptly as in *uni*. In order to make these points clear, several examples will be given which have been classified according to the shape of the curve. (The figures in parentheses given below stand for the diagram numbers of the Japanese sentences.)

(a) The pitch varies smoothly.

(1) The pitch remains almost constant.

seitai (聲帯) (34), *sanpai* (参拜) (34), *taue* (田植)

In *seitai* and *sanpai*, the pitch is not uniform throughout the word; only the partial average of the pitch of each syllable is equal. It goes without saying that some syllables have a slight rise while others have a slight fall.

(2) The pitch slightly rises.

	Rising Interval (Ratio of Pitch)
<i>tonbo</i> (蜻蛉)	1.07
<i>morau</i> (貰ふ)	1.06
<i>kanemochi</i> (金持)	1.10

(3) The pitch gently falls.

	Falling Interval (Ratio of Pitch)
<i>bō</i> (坊)	1.15
<i>koe</i> (聲)	1.12
<i>karasu</i> (烏)	1.06
<i>kirei</i> (綺麗)	1.12
<i>soramame</i> (そらまめ)	1.20
<i>korogi</i> (蟋蟀)	1.30
<i>tōgan</i> (冬瓜)	1.45
<i>eiga</i> (映畫)	1.90

As is shown in Fig. 34, the pitch-curve of *koe* is level initially and then falls in an almost straight line. In *soramame* and *eiga*, the pitch falls after having risen. The former is said to be of the type "low-high-mid-mid", in which the initial *so* syllable is higher in pitch than the final *me*.

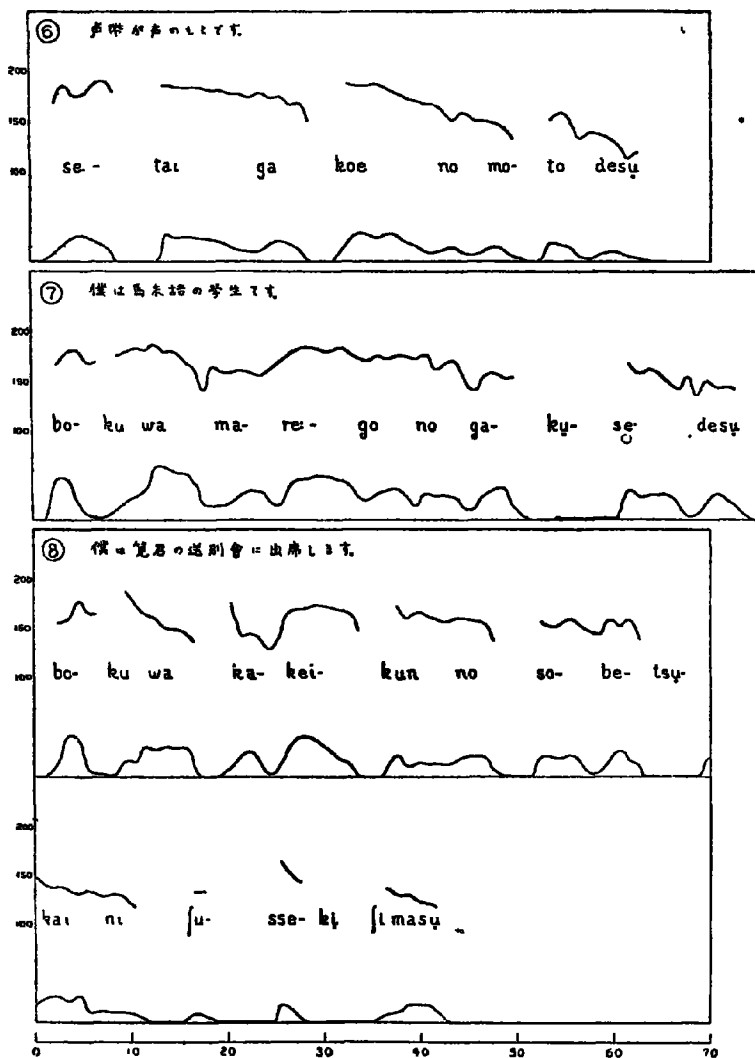


Fig. 34—1.

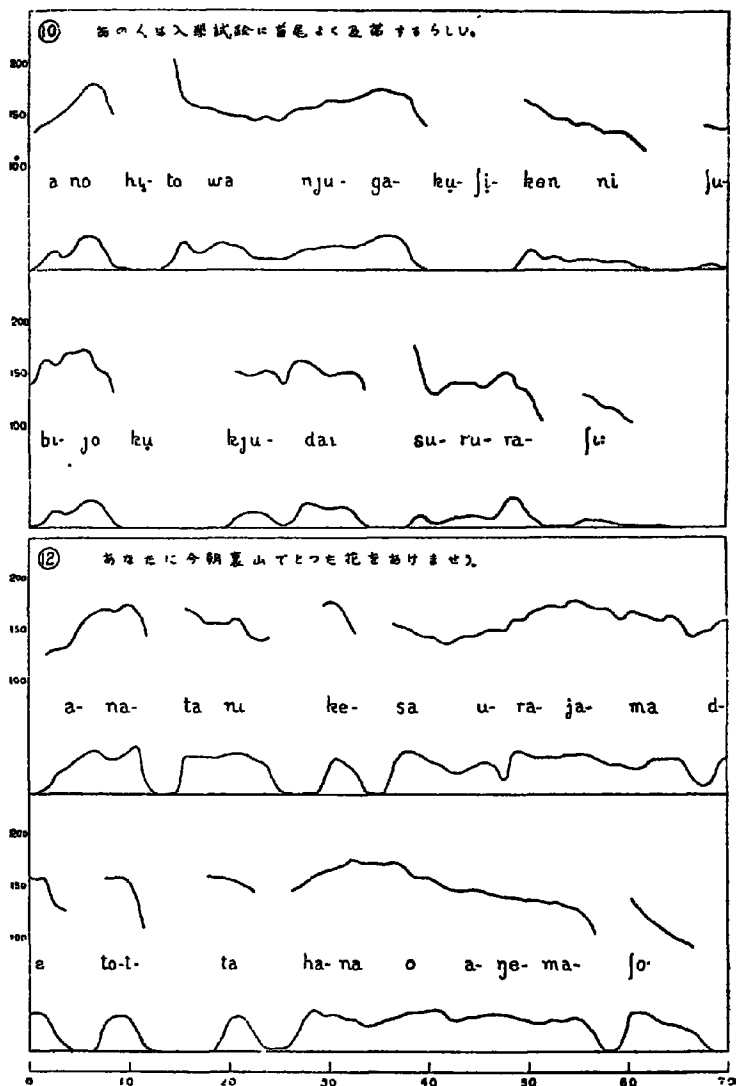


Fig. 34—2.

(4) The pitch rises and falls.

	Rising Interval (Ratio of pitch)	Falling Interval (Ratio of pitch)
<i>bon</i> (盆)	1.06	1.06
<i>nyūgakushiken</i> (入學試験)	1.20	1.20
<i>obāsan</i> (おばあさん)	1.57	1.83
<i>niisan</i> (兄いさん)	1.54	2.20

(b) The pitch rises somewhat abruptly.

	Rising Interval (Ratio of pitch)
<i>eo</i> (繪を)	1.46
<i>eigo</i> (英語)	1.42

These words, as distinguished from those mentioned below are felt to be not so strong considering the greatness of the interval. This is because the pitch rises in them in proportion to the stress and not so abruptly.

(c) The pitch rises suddenly and then slightly falls.

The rising intervals of the pitch and the interval between two syllables at the points of the highest pitch are given as follows:

	Rising Interval (Ratio of pitch)	Interval between Syllables
<i>aki</i> (秋)	1.20	—
<i>ine</i> (稻)	1.08	1.05
<i>uni</i> (雲丹)	1.13	1.15
<i>ai</i> (愛)	1.10	1.08

(d) The pitch of two syllables goes on in gradation.

	Interval between Syllables (Ratio of pitch)
<i>moto</i> (本)	1.07
<i>hata</i> (旗)	1.09
<i>sake</i> (酒)	1.15
<i>mochi</i> (餅)	1.18
<i>aki</i> (空き)	1.18
<i>hato</i> (鳩)	1.09
<i>sake</i> (鮭)	1.09
<i>mochi</i> (麴)	—
<i>aki</i> (秋)	—

In the last three, the pitch rises abruptly on the first syllable as in (c),

(e) The pitch falls or is level initially, suddenly rises and then becomes level. (This is principally what Dr. Sakuma calls "undulation type".)

	Rising Interval (Ratio of pitch)
<i>obasan</i> (おばさん)	1.10
<i>sugu</i> (すぐ)	1.23
<i>aozora</i> (青空)	1.20
<i>shubiyoku</i> (首尾よく)	1.20
<i>sakujitsu</i> (昨日)	1.25

On the syllable *a* of *aozora* and the syllable *o* in *obasan*, the pitch falls, and at the same time the voice becomes strong; accordingly the highest pitch is not felt so high. On the other hand, the points of highest pitch and maximum stress coincide in *san* of *obasan*. The impression of pitch produced by the syllable, therefore, corresponds not to that of the average pitch but to that at the point of highest pitch (at the same time the point of maximum stress).

(f) *Iro* has a sudden fall in pitch on the syllable *ro*, the falling interval being 1.24.

The above examples show that the interval ranges chiefly from 1.06 to 1.25 (i.e. minor second—major third) in words consisting solely of short vowels, and that in those formed by long vowels alone it varies mostly between 1.3 and 2.0 (i.e. fourth-octave). The interval varies greatly from individual to individual and also according to the intrinsic quality of the word. In a word with a greater interval, the pitch varies proportionally with the stress. Consequently we have no such impression that the pitch alone is changing widely.

Besides those above-mentioned, the remainder are mostly combinations of the various forms of pitch and stress. For example, the difference between *Kakei* (name of a person) and *kakei* (household account) in both of which high and low pitches and rising and falling tones are combined, lies in that the second syllable is either of rising tone or of falling tone. The interval between *ka* and *kei* at the points of highest pitch is the same.

(C) The construction of Japanese syllables is entirely different from that of English, German and French syllables. In these European lan-

guages, there are long syllables as well as short ones which are uttered with varieties in speed and are more or less isolated. Japanese syllables, on the contrary, are linked up with one another, each consisting of a short vowel preceded by a consonant. The connection is never broken except when it is forced to be to facilitate pronunciation. The Japanese sentence No. 7 given in Fig. 34. is perhaps a typical example. The curve in Fig. 34. is broken here and there. This is because the vowel becomes voiceless as in *hi* and *ky* or there intervenes a fricative with a small amplitude such as [s] and [ʃ].

(D) In order to see if the accent of a word undergoes modification by emphasis, research has been made into the relations between pitch and stress of the sentences *Hanaga kireida* (*hana* is given emphasis), and *Kireinanowa hanada* (*Kirei* emphasized). As is noticed in Fig. 35., the pitch-curve at the junction of the *hana* and *ga* in No. 13 is identical with that at the junction of the non-emphasized *hana* and *da* in No. 14. The accent, therefore, undergoes no modification by emphasis. In *hana* of No. 13, the *na* syllable that is at the "peak of accent" is stronger than *ha* that is not and the subsequent auxiliary particle *ga*. But in *hana* of No. 14, *na* is not much stronger than other syllables. The same is the case with *kirei*. From this we learn that emphasis depends upon stress in languages with pitch accent such as Japanese. When, however, an emphasized word or phrase stands apart from other words or phrases and there exists no accentual relation between them, the pitch of the word or phrase can be raised as it is, without the shape of the pitch-curve being much altered. The *shukusu* in sentence No. 15, *Sotsugyōshiki o shukusu*, is an example of this.

In the sentence *Hanaga kireida*, *hana* has the highest pitch and the effect of emphasis is obtained by producing the syllables stronger; but in the case of *kirei* the emphatic effect is not made merely by stronger pronunciation, for the word is lower in pitch than *hana*. In such a case a sentence is employed with a suitable tone that contains a special word. Examples: *Hanaga kireidane*; *Hanaga hijōni kireida*.

(E) When a sentence closes with a word the final syllable of which is low-pitched, how does this affect the pitch accent? To solve this question, a study has been made on the oscillogram of sentence No. 16 *Haru? Aki?* As noticed in Fig. 35-2, in *Haru?* the pitch falls somewhere between

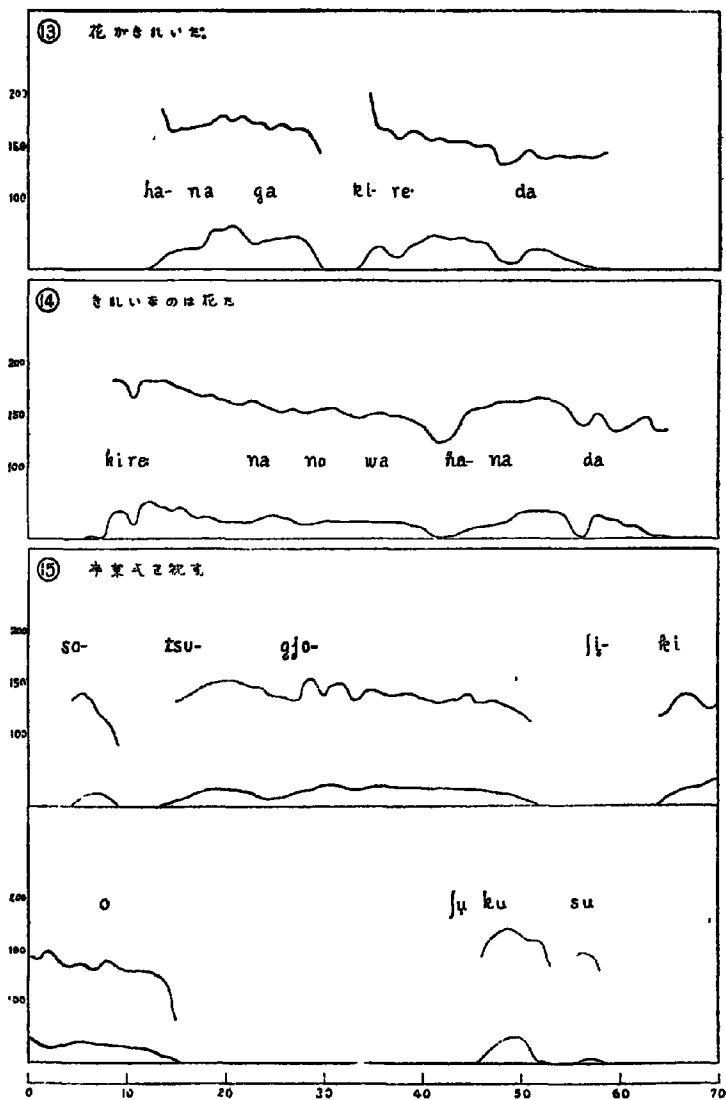


Fig. 35-1.

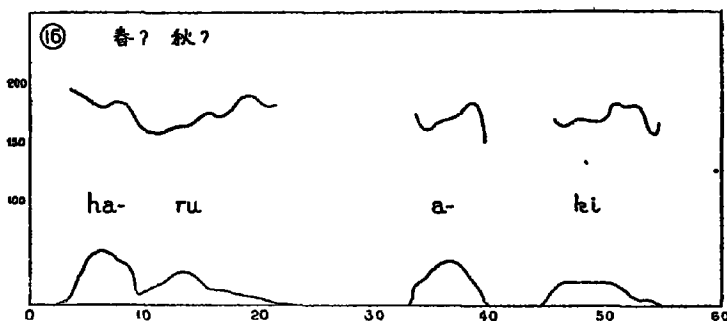


Fig. 35—2.

ha and *ru* and then rises. In this case, a strong stress falls on the first syllable, and the stress decreases toward the end. The ascent of pitch is made prominent since the pitch varies in inverse ratio to the stress. *Ru* is much longer than in a descriptive sentence. In normal pronunciation, *ki* in *aki* usually turns to a voiceless sound, but in a question it retains the full value of the voiced sound. *A* and *ki* are almost equal in the average pitch; in *a*, however, there is a sudden rise in pitch so that this syllable is felt to be stronger than *ki* as is instanced in *uni*. Furthermore, *ki* is weaker and a little longer than the preceding *a*; and a slight rise in pitch in the syllable *ki* shows that the word is used interrogatively. By these features the word can be distinguished from *aki* in Fig. 10. Analogous examples are numerous in Japanese, but detailed investigations with regard to them will be made on some future occasion.

III. 7. Chinese.

As material for the study of Chinese, the following three expressions and four sentences have been used, the speaker being Mr. Chai Shou Chih.

1. 地。方 [tʰi˥-faŋ˥]
2. 張。羅 [tʃaŋ˥-luo˥]
3. 中。華。民。國 [tʃuŋ˥-hua˥-min˥-kuo˥]
4. 僑。上。那。兒。去。? [ni˥-faŋ˥-na˥-er-tʃy˥]
5. 上。學。校。去。[ʃaŋ˥-ɕye˥-ɕiau˥-tʃy˥]
6. 僑。念。甚。麼。書。哪。? [ni˥-nien˥-fən˥-mo˥-ʃu˥-na˥]
7. 我。念。國。語。哪。[uo˥-nien˥-kuo˥-y˥-na˥]

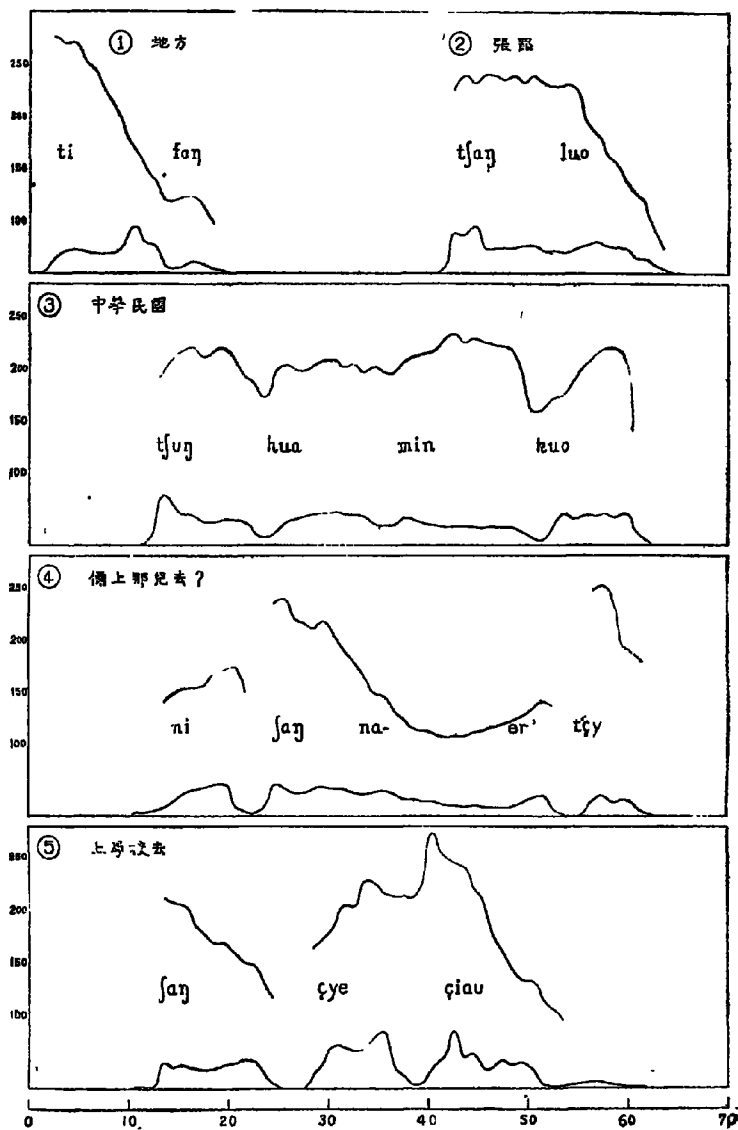


Fig. 36—1

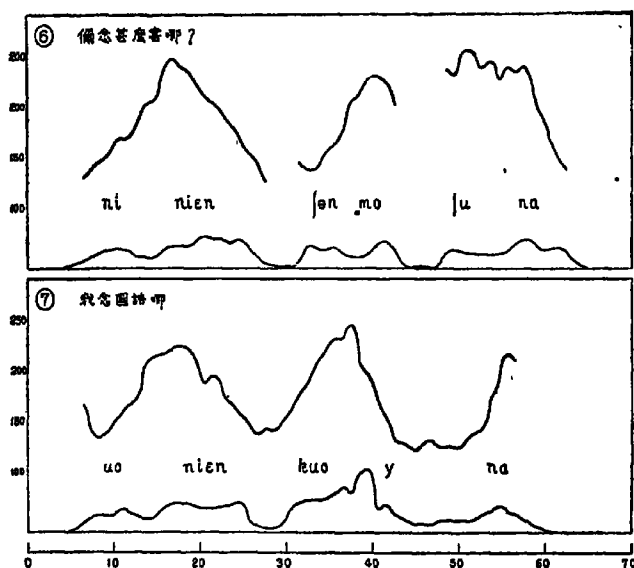


Fig. 36—2.

It has already been stated that there are four kinds of accent in Chinese and that they are represented either by the symbol [◌] in different positions or by figures. The sign [—] stands for emphasis. (The emphatic sign and the symbols of accent have been supplied by the speaker himself and a Japanese teacher of Chinese).

(a) In Japanese polysyllables, the length of the syllable is extremely short and the pitch is subject to restriction only at the junction between syllables and is otherwise free to rise or fall either at the beginning or at the end of a word. Accordingly when at the end of an interrogative sentence comes a word that is low-pitched finally, the pitch falls where the penultimate is joined on to the last syllable and then rises again to show the sentence is interrogative. The pitch at both ends of the word is, therefore, free to rise or fall unless the accent undergoes modification.

In Chinese, on the other hand, each word has a stereotyped rise and fall, as it were. When the word becomes one unit in the formation of connected speech, how is such an immutability in pitch affected? A

few words will be said on this question.

When two "faŋ ɣəŋ" (syllables of level-rising tone) occur consecutively, the first is altered to "ɕia p'ɨŋ" (abrupt rising tone), according to the rules of change in "s ɣəŋ". There seem to be no other rules and in the case of a compound consisting of two or more than two words, the accent of each element remains the same as when it stands by itself.

(b) As shown in the diagram, [ti' faŋ'] and [tɕaŋ' luo²] furnish examples of dissyllables. In the former, the initial syllable has a fall and the final is level. This shows that the accent is by no means modified by the union of the syllables. On the other hand, in [tɕaŋ-luo], [luo] that is preceded by [tɕaŋ] is uttered on a falling tone when it should be on a rapid rising tone. This is contradictory to what has been said before and may be due to the fact that the speaker has employed a dialectal variety of speech. In the quadrisyllable [tɕuŋ¹-hua²-min²-kuo²], the first syllable is uttered on a level pitch and the last three on a rapid rising pitch. [tɕuŋ] and [kuo], therefore, as illustrated in the diagram, are not deprived of their original features in accent. The pitch rises in [hua] and [min], but their pitch intervals are smaller than the rising interval of about a fifth in [tɕi²] and [fa²] uttered in isolation to study "s ɣəŋ".

Except where syllables are so combined as to ensure easy utterance, e.g. in such a dissyllable as is uttered on a level pitch initially when there is a rise or fall on the final syllable, or on a rising pitch with a final fall, and vice versa, the rising interval is naturally small as when syllables are uttered on a rising sequence inasmuch as they are closely connected to form a new phrase.

(c) In sentence No. 4, [ni¹-faŋ¹-na¹-er-t'ɕy] the auxiliary particle [-er] is combined with the preceding [na¹] to create a syllable. As shown in the diagram, the rise takes place on [ni] and [faŋ-na-er] is uttered on a falling sequence. The pitch then ascends toward a higher note and the fall takes place in [t'ɕy]. That the curve for [na-er] is of such a shape as is shown in the illustration is due to the particular form of accent of the syllable. In sentence No. 4, in consequence, the accent of words retains its proper form and all the syllables have the stress of almost the same degree.

In sentence No. 5 [ɕaŋ¹-ɕye²-ɕiau¹-t'ɕy¹], [ɕaŋ] is uttered with a falling

tone, [çye] with a rising pitch, [çiau] having a falling tone. Their rising and falling intervals are the same as when in isolation. The fall should take place in the final [t'cy], but actually the pitch varies only a little and the stress is rather weak.

Sentences No. 4 and No. 5 have been used to see whether there is any difference to be noted according as the same [t'cy] with falling tone is at the end of an interrogative or a descriptive sentence. In No. 4, the above-mentioned syllable has the stress of nearly the same degree as any other and has rather a high pitch which is quite natural. The stress is extremely weak, however, in the same syllable in No. 5, the pitch being rather low. It may be observed that the accent undergoes alteration in the latter case. Unlike other languages, the difference between the Chinese interrogative and descriptive sentences lies in the fact that in the former the pitch can be raised *en masse* while maintaining the falling tone and simultaneously the status quo, so to speak, of the stress. In the sentences No. 6 [nɪ¹-nien¹-ʃən²-mo¹-fu¹-na¹] and No. 7 [no¹-nien¹-kuo²-y¹-na¹] the [na¹] is level in accent, but in No. 6 the pitch is rather high on the same syllable, being a continuation of the high pitch of the preceding [fu]; and the stress is about the same as on other syllables. The accent of the syllable is, therefore, quite normal. In No. 7, [na] is weak and has a lower pitch than the preceding syllable, but the pitch rises instead of being level. The syllables [ni], [nien] and [ʃən] are pronounced respectively with rising, falling and rising tone, so that in each case the accent is quite regular. And yet [nɪ¹] and [ʃən²] can clearly be distinguished, although they are alike in having a rising tone. Again the accent is quite normal in the syllables [mo], [fu], [na] with level tone. [uo], [nien] and [kuo] in No. 7 are also natural; but in [y¹] the pitch continues to rise for about 2/50 sec. and then falls—this appears to be not in accordance with the normal pitch of [y¹]. Instead, the stress is remarkably on the increase.

(d) In Nos. 3 and 6, no great divergence in the degree of stress of the words is perceptible, but in No. 4, [kuo] is stronger and in No. 5 [çye-çiau] both stronger and higher. The difference in stress is almost negligible in No. 6, but in No. 7, [kuo-y] is stronger and higher.

It is customary in Chinese to pronounce the principal word of a phrase

with as exact an accent as possible and to give special force to its tone so that it may stand out from the rest of the phrase. This is called in Chinese "tjung nien" or "t'çion t'iau" of which the explanatory examples are given above.

The stress-curve forms a trapezoid, both ends of which sometimes jut out. All this is peculiar to "t'fuy nien". For example, the stress-curve of [ti-fuy] in the sentence No. 1 is characteristic of Chinese and unknown to any other language. Besides long vowels, diphthongs, triphthongs and nasal vowels are found in Chinese. The reason is this: inasmuch as any one single syllable forms a word in Chinese, the syllable (naturally) tends to be pronounced longer than otherwise so that there may be more varieties of sound and the accent may be more prominent—a feature that is unmistakably characteristic of the language.

III. 8. Korean.

The following six sentences have been treated as material for the study of accent in Korean, the speaker being Mr. Chang In-Sap, Professor in Engi College, Seoul.

1. 조선정청정인접 [dʒo sən gŋəŋ sən dʒəŋ in sɐp₁]
2. 쌀밥 많다 [ʔsaɪ bab₁ man tha]
(There is plenty of boiled rice.)
3. 큰갓 껴다 [khɪn gaɬ₁ ʔdʒiɬ₁ ʔda]
(I put on a big strawhat.)
4. 바다가따뜻하다 [ba da ga ʔda ʔdɪɬ₁ ha da]
(The sea is warm.)
5. 어디가? [nə ə di ga]
(Where are you going?)
6. 난몰라 [nan mol la]
(I don't know.)

(The symbols in parentheses are those used for phonetic transcription of Korean speech in Korea).

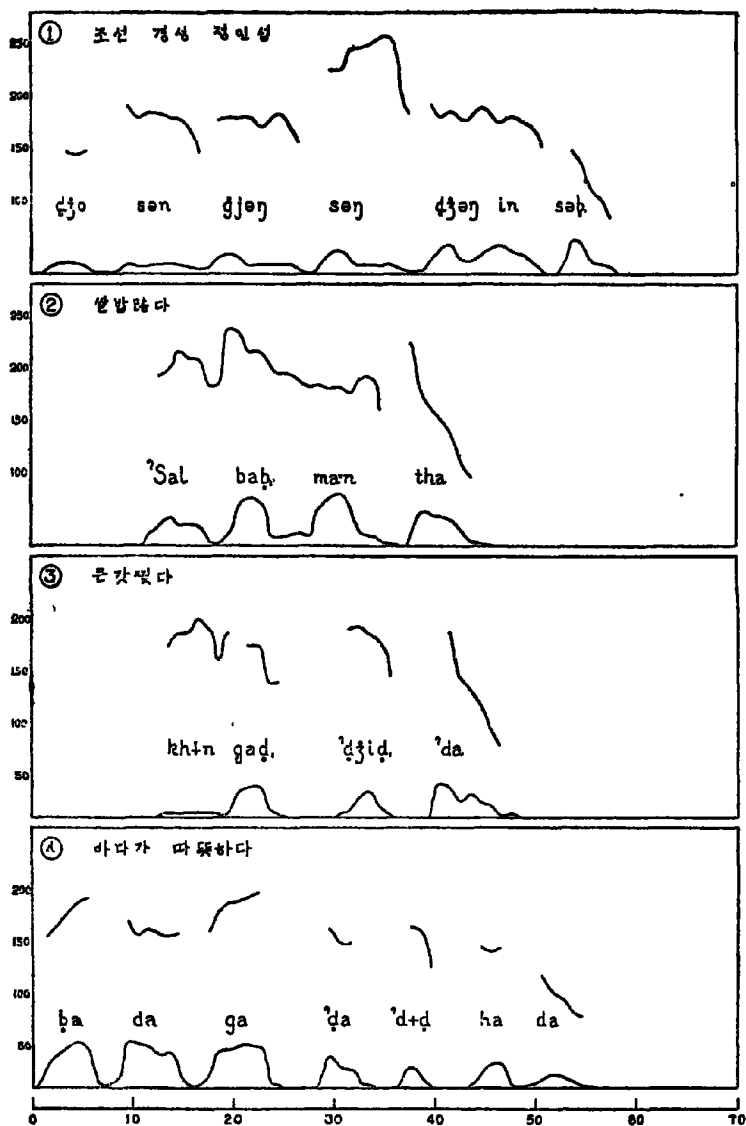


Fig. 37—1.

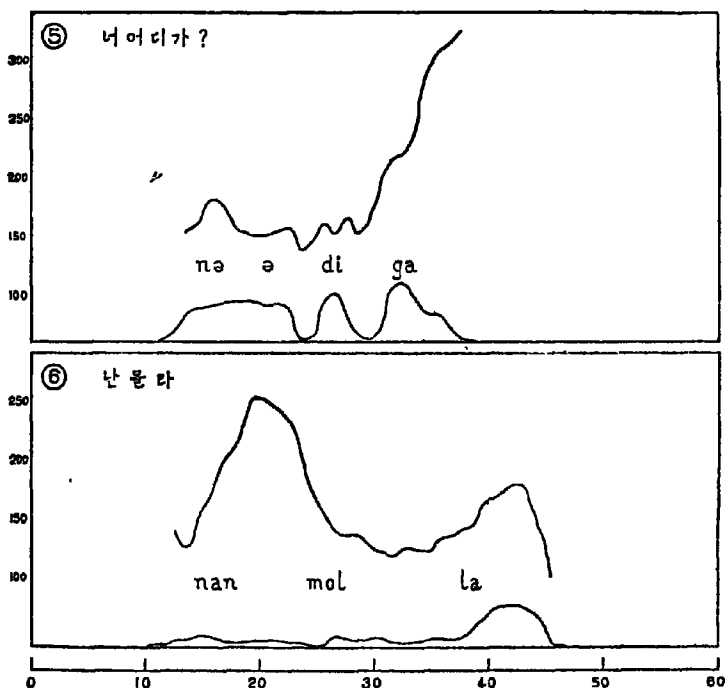


Fig. 37—2.

In Korean, as in European languages, innumerable sounds are created by the combination of vowels and consonants. For instance, the initial letter **ㄴ** [d_go] of sentence No.1 has been formed by adding the vowel **ㅏ** [o] to the consonant **ㄷ** [d_g]. In like manner, as **ㅅ** stands for [s], **ㅊ** for [ç], and **ㄴ** for [n], the three make **선** [sɛn].

(a) Korean consists of the elements native to the language, and various idiomatic phrases adopted from Chinese. It bears a close resemblance to Japanese in the use of auxiliary particles and in word order. The two languages, however, differ greatly in their phonemes (both vowels and consonants). A comparison of two languages which resemble each other grammatically, and yet differ phonetically is very interesting in connection with the problem of accent.

(b) The stress of sound will first be dealt with.

The stress increases in No. 1 and decreases in No. 4 as it approaches the end. In Nos. 2, 3 and 5, the stress remains almost constant throughout the sentence, but the final syllable is especially stressed in No. 6. Of course, with these materials in hand we cannot hasten to lay down any definite rule as to stress.

(c) A study will now be made on pitch. Sentence No. 1 does not supply very significant data. It consists of the dissyllables [dʒo sən] and [gʒəp sən] and the trisyllable [dʒəp in səb₁] pronounced in succession. [sən] in the first dissyllable is higher than [dʒo], and [sən] in the second is uttered on a higher pitch than [gʒəp]. Again, [dʒəp], [in] and [səb₁] are similarly pitched, which is indicative of pitch accent.

In the Korean dissyllabic words illustrated in previous section, the first syllable has a rise or rise-fall and the second a falling pitch and there is a difference in pitch between the two syllables (Fig. 15). In this connection, it has been pointed out that Korean is capable of being classed under the group with pitch accent. Analogous examples of this type of accent may also be seen here. Namely, of [ʔsal baḥ₁] in No. 2, [kh+n gaḥ₁] in No. 3, and [ha da] in No. 4, the first is high-pitched on the final syllable and the last two on the initial. The reason why the second syllable of [ʔsal baḥ₁] and [kh+n gaḥ₁], unlike that of the isolated [dʒəp ʔgun] and [an ʔdʒa] as mentioned in chapter II, is not uttered on a normal falling tone is this: the syllable begins with a voiced consonant so that it links in pronunciation with the preceding syllable.

(d) In the descriptive sentences Nos. 2, 3 and 4, the pitch uniformly falls sharply when the end of the sentence is reached. Although No. 5 is interrogative, a remarkable rise takes place finally (to judge from other examples, this is presumably due to the manner of pronunciation). Being declamatory, No. 6 is especially stressed in the end of the sentence. We shall perhaps have a similar phenomenon, if a Japanese sentence with the same meaning as this is pronounced.

III. 9. Hindustani.

The following thirteen sentences spoken with standard Delhi accent have been used as material for Hindustani, the speaker being Mr. Barlas.

1. maṇ aḍḍ subah saṭṭ badḍe: uthkar maḍarse: gajar
(This morning I got up at 7 o'clock and went to school.)
2. dōṛpaher ke baḍ maṇ waḷiḍ saḥab ke maḍarse: aṛja
(In the afternoon I went to my father's school.)
3. jahaṇ profesarōṇ se baṭṭ tṣiṭṭ ki:
(There I had a talk with the professors.)
4. kām ke ḥaṭam hōṇe: par ma ṇ ghar dḡar-uṅga:
(After finishing up the work, I shall go home.)
aur tṣhe badḍe: khaṇa: kha:uṅga:
(and at 6 I shall take dinner.)
5. phir ḍm ka: sabaq jaḍḍ karne: ke baad maṇ soṛ dḡar-uṅga:
(Then after revising the day's lessons I shall go to sleep.)

Conversational style:

6. kjar aṛp dḡarpani: khaṇa: kha: sakṭe: haṇṇ?
(Can you eat Japanese meals?)
7. dḡi: haṇṇ maṇ ṭhōṛa kha: sakṭa: huṇṇ
(Yes, there are some dishes that I enjoy.)
8. dḡarpani: a:bohawa: kaisi: maalum hōṛṭi hai?
(What do you think of the Japanese climate?)
9. garmi: zyaḍah ṭaklir nahinṇ ḍetṭi: lekin dḡarṛe: meṇṇ sardi: saḥṭ
ṭaklir ḍetṭi hai
(The heat does not trouble me, but I suffer from the cold in winter.)

Emphatic sentences:

10. je hir merri: kiṭaṛb hai ("je" emphasized)
(This is my book.)
11. jih merri: hir kiṭaṛb hai ("merri" emphasized)
(This is my book.)
12. jih merri: kiṭaṛb hai
(This is my book.)
13. kis ne us ko maṛdṛlaṛ?
(Who killed him?)

Of the above thirteen sentences, Nos. 2, 5, 6, and 7 have been excluded, for they bear a close resemblance to Nos. 1, 4, 8 and 9 respectively. The diagrams of curves in which are shown the relations between pitch and

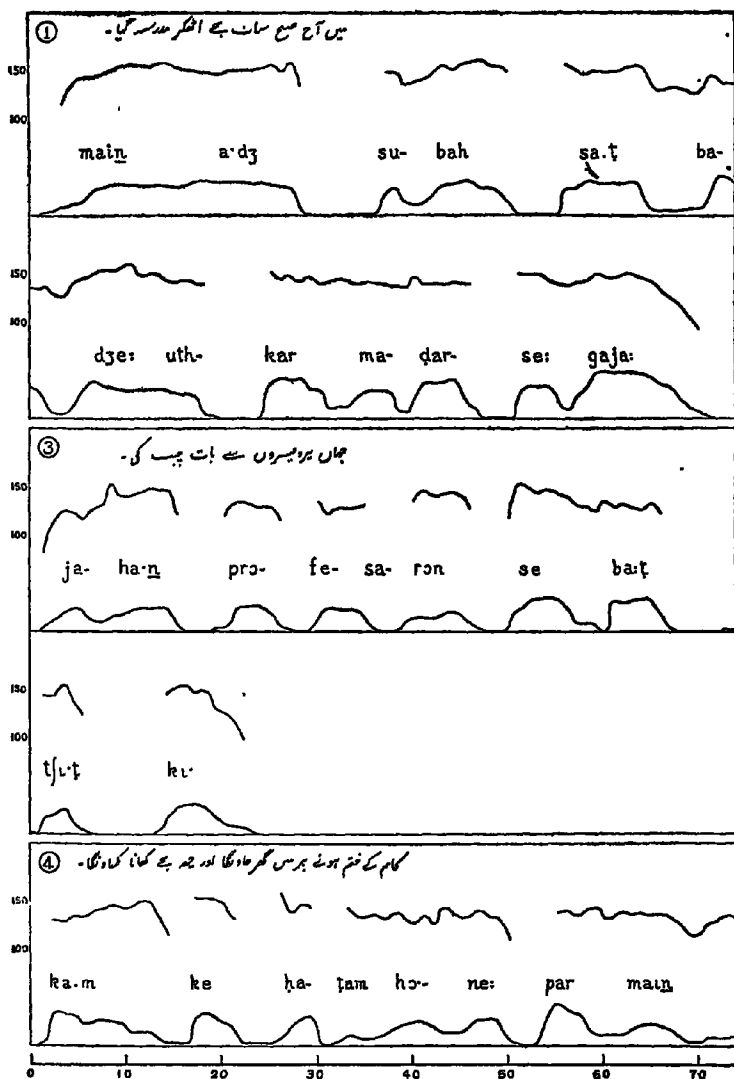


Fig. 38—1.

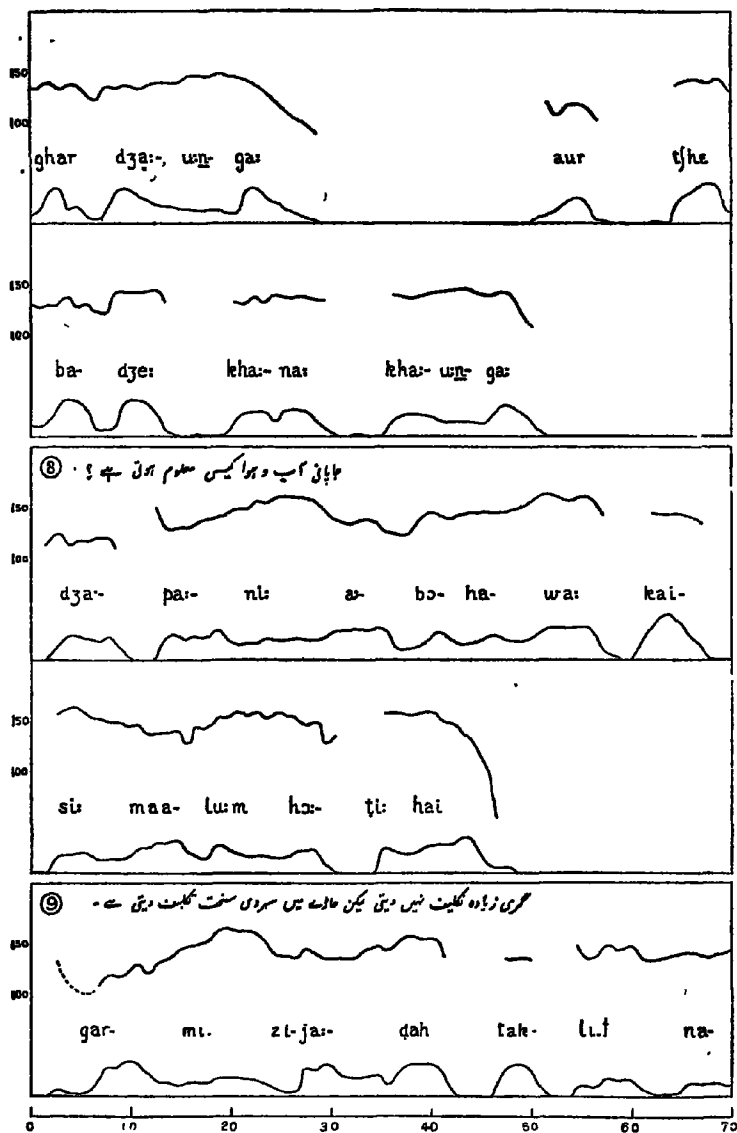


Fig. 38—2.

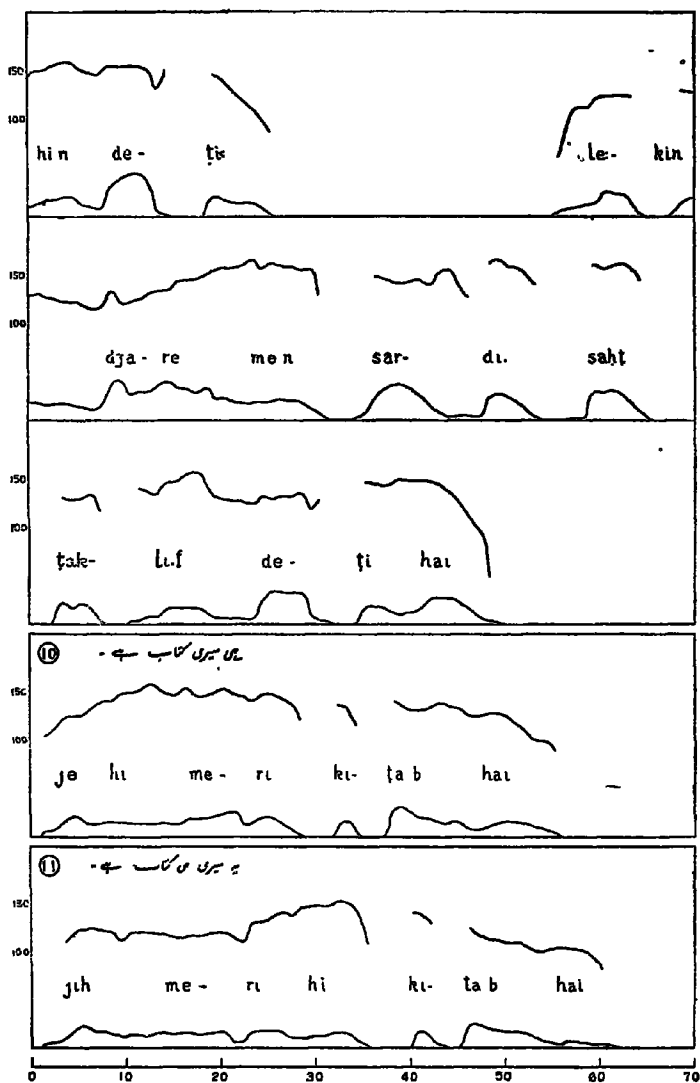


Fig. 38—3.

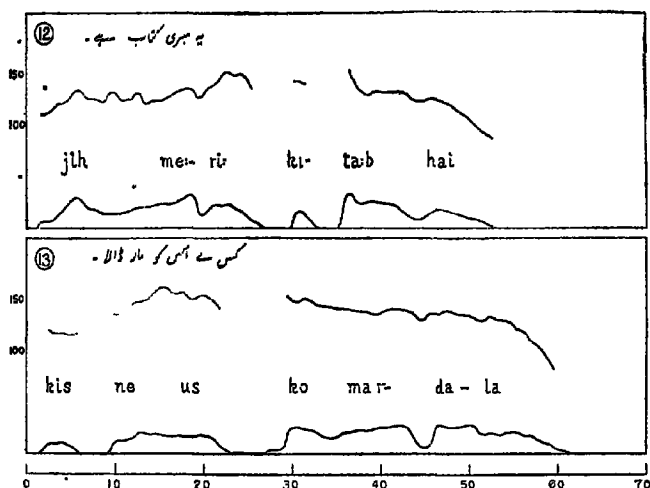


Fig. 38—4.

stress in the remaining sentences (Nos. 1, 3, 4, 8, 9, 10, 11, 12 and 13) will be used as data for an examination of the accent of Hindustani.

(a) Hindustani is closely allied to Japanese and Korean in its word order and the use of auxiliary particles. The pitch and stress vary only slightly in the language.

In polysyllabic words uttered in isolation, the pitch continues to rise gently up to the point of maximum stress on the final syllable, and then begins to fall simultaneously with the decrease in stress. It is the same when the word occurs in connected speech except that in this case the pitch remains high, under the influence of the subsequent word, up to the close of the final syllable. Examples: [subah], [badʒer], [uthkar], [maʒarser], [gajar] in No. 1; [dɔ:paher], [ʔaklir], [ʔaʃam], [khar:mar], [ʔhorar], [dʒar:er], [lerkin], in the remainder of the sentences.

(b) Words that end sentences, such as [gajar], [arja], [ki], [dʒar-ungar], [khar-ungar], [hum], [hai] etc., have a terminal fall just as when they are uttered as separate words.

(c) The rising pitch of [dʒar:parni:], [ar:bhawar], [kaisir], [ma:alurm], etc. that occur in the interrogative sentence No. 8, seems to be a little greater than in the descriptive or the narrative sentences. [hain] that

comes at the end of the interrogative sentence in No. 6 has a very slight rise, whereas in No. 8 the final [hai] shows a falling tone. The reason is this: No. 6 begins with an interrogative word [kja:] while in No. 8 the corresponding word is in the middle of the sentence. As in other languages, interrogative sentences without any interrogative word have normally a rise when final.

(d) Although in Hindustani there is a tendency towards a rising intonation, the stress in the language varies almost from word to word. Hence the question arises as to whether the language belongs to the pitch accent or stress accent type.

In sentence No. 9, the same word [d̪e:ɽi:] occurs twice, first at the end of the initial clause and then as the last word but one of the final clause. In the former case, the final syllable is slightly lower than the preceding and has a terminal fall, but in the latter, the final syllable is higher. The stress is spread over syllables similarly in both cases, the way of distributing stress being more or less fixed in the language. In the emphatic No. 10 and No. 11, [je] and [meri:] are emphasized by attaching [hi] and [hi:] respectively. These two and the descriptive No. 12 have the same word [ki:ɽa:] in which the pitch varies according to the sentence but the stress follows the same fashion of distribution. Especially in No. 11, despite the fact that [hai] is extremely weak, the preceding [-ɽa:] retains some relative stress as against [ki]. From these observations, Hindustani may be said to be a language with stress accent, and a tendency towards a rising intonation.

III. 10. Russian.

The two phrases and ten sentences given below as pronounced by Mr. Wanovsky have been selected as material for Russian.

1. na pravə. (to the right.)
2. na tʃáku tʃáju. (to tea)
3. zvónkə ɪ dəl'əkó rəzdəjótʂə tʃi:ɽəvətʃeskə go:ɽəs fpustət'ě.

(In the hollow a man's voice resounds loudly and afar.)

4. moj drat-pr'il'égno mál'tʃik. (My brother is a diligent person.)
5. právə əná xərófin'kəjə. (She is really beautiful.)
6. ja xərəjó əb'édəɪ. (I have eaten enough.)
7. ja xərəjó əb'əxəɪ (I had a good excursion.)

TONAL PECULIARITIES OF VARIOUS LANGUAGES.

8. étə xərəjó ? (Is it good?)

9. da, étə xərəjó. (Yes, it is good.)

10. iván ivánovitʃ dómə ? (Is Ivan Ivanovitch at home?)

da, dómə. (Yes, he is.)

n'et n'idómə. (No, he is not at home.)

These sentences given above are not written in ordinary Russian orthography, but in phonetic transcription of standard Moscow speech. The sign ['] on the upper right-hand corner of each phonetic symbol and over each vowel stands respectively for soft sign and accent mark.

Of these phrases and sentences, the two phrases Nos. 1 and 2 and the sentence No. 6 that is analogous with No. 7 will be omitted. With regard to the remaining nine sentences, the relations between pitch and stress may be represented in curves as in the diagrams on the following pages.

(a) In Russian, the pitch and stress vary to a remarkable extent. The rise takes place in the first half and the fall in the latter half of a phrase or short sentence in description. In the long sentence No. 3, the rise and fall in pitch are sharpest initially and become less so toward the end, the lowering of tone accompanying this change.

(b) The "accented vowel" is usually stronger than the "unaccented vowel", but sometimes there is observed but little difference in stress. For example, in [razdajótsə] the first three syllables are produced with much the same degree of stress, but the last syllable alone bears extremely weak stress. Again in [tʃíʃəvétʃeskə] the first three syllables are similarly stressed, the final [-kə] is slightly weaker and [-tʃes-] becomes voiceless. Speaking generally, the "accented syllable" is longer in duration than the "unaccented."

(c) The "accented syllable" is not necessarily uttered with greater stress than the "unaccented". But the rise invariably occurs on the "accented syllable" of a word within a rising or level sequence in the sentence. Examples: [zvónkə], [dəl'əkó], [razdajótsə], [tʃíʃəvétʃeskə], [góʃəs] in No. 3; [xərəjó] (7); [iván] (10), etc.

There is a drop in pitch, however, on the "accented syllable" of a word within a range of falling tone in the sentence. Examples: [právé] (1); [tʃáju] (2); [mál'tʃík] (4); [xərəʃín'kəjə] (5); [ivánovitʃ] (10), etc.

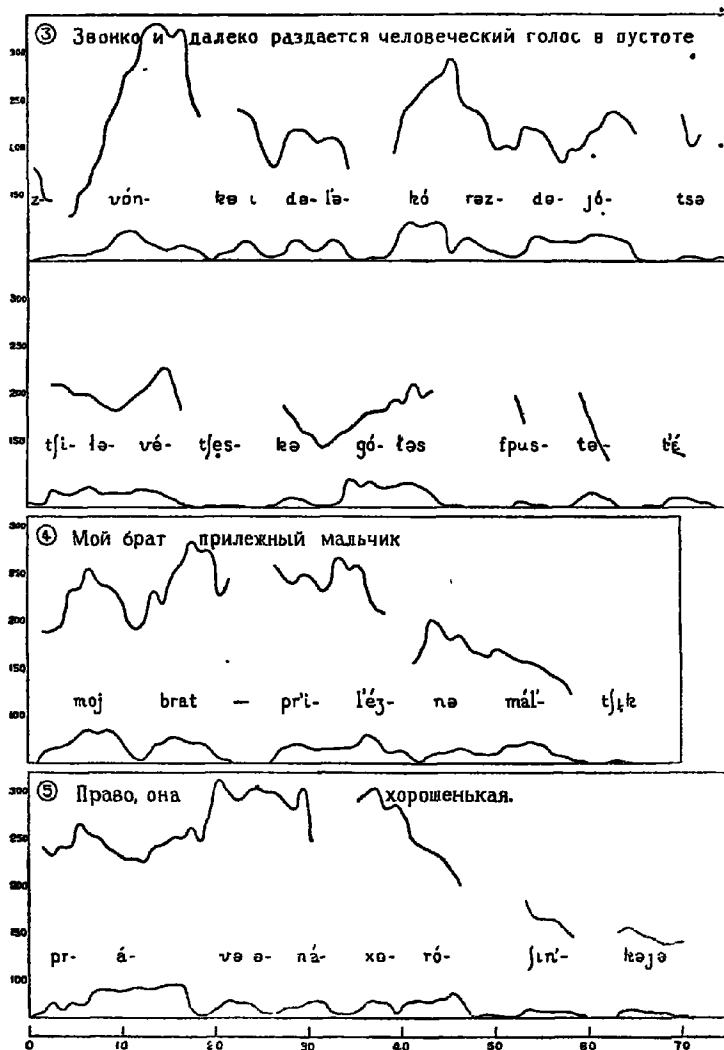


Fig. 89—1.

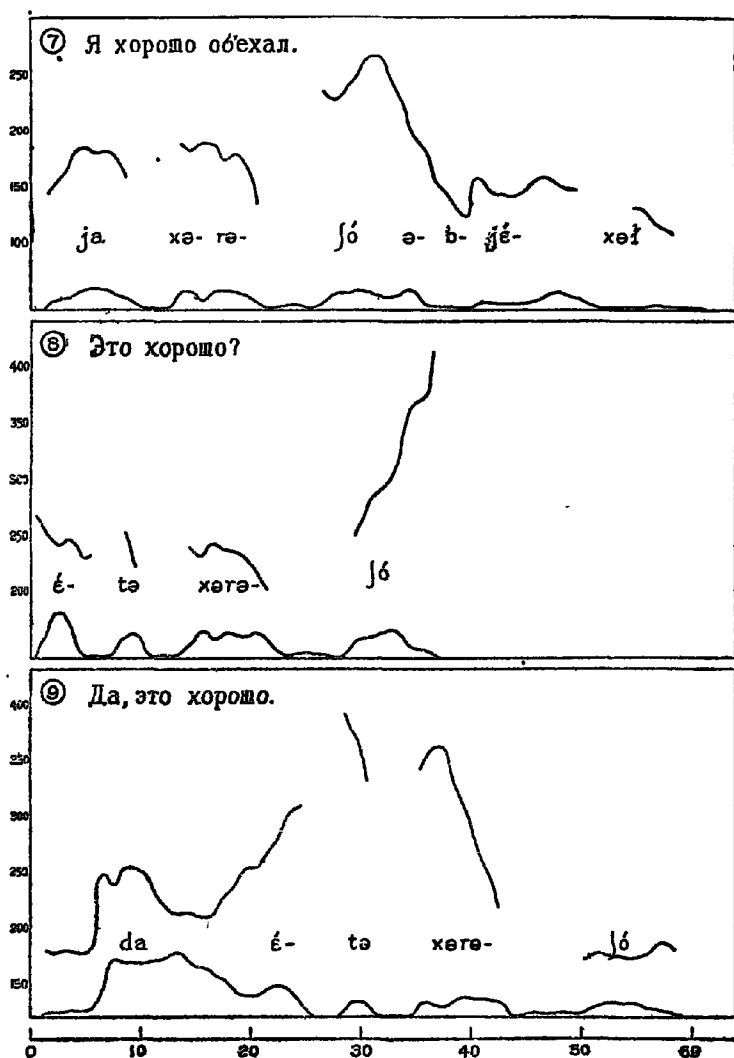


Fig. 39—2.

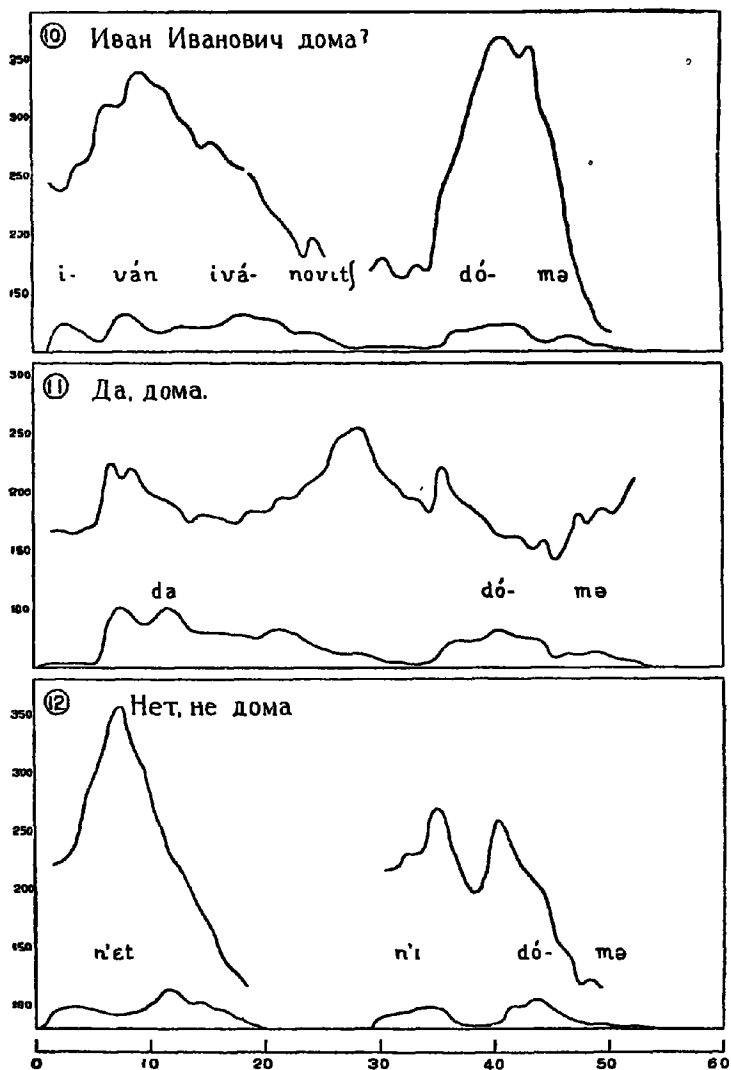


Fig. 39—3.

One of the characteristics of the accented syllable with a level or falling sequence in the sentence may be a rapid rise which, followed by a level tone, ends with an equally rapid fall and a gradual increase in stress. Examples: [pr'ɪl'ɕɣnə] (4), [əb'édəɪ] (6); [əb'ɛxɪ] (7), etc.

(d) The interrogative is nearly akin to the descriptive sentence in this respect. Only on the "accented vowel" of the word with an interrogatory meaning, the pitch ascends to a remarkably high pitch as in [xərəʃó] (8) and [dómə] (10).

(e) Although there is a rise in pitch on the "accented vowel", the fixed element of the word is not the pitch but the stress. In sentences Nos. 7, 8 and 9, the same word [xərəʃó] functions differently according to the circumstances under which it is uttered. The stress undergoes but little alteration, although the pitch takes a special form according to the sentence. Similarly, [dómə] is used in the interrogative No. 10, affirmative No. 11 and negative No. 12. And like [xərəʃó] it works differently according to the context. In No. 12, however, it decreases in stress on the second syllable so that the negative meaning is made clear. It may be known from this that the stress also varies to some extent so long as the accent remains unaffected. And though the order of stress between syllables undergoes no alteration, the ratio of stress varies within a considerably wide range.

III. 11. Mongolian.

The following sentences as pronounced by Mr. Sheh Yun-ch'ing have been employed as material for Mongolian.

1. tere xolda-nai hun mayatur mukuden du ešine.
(The merchant will go to Mukden to-morrow.)
2. ene ɣɔɪl bolbalɕin tere daba-nai zun-teigus ɣarɕi baina.
(This river starts from the eastward of that mountain.)
3. ta jiben hile helɕi ɕidanu ?
(Can you speak Japanese?)
4. ta dor doɪxot dortai jur ?
(Do you like to sing a song?)
5. tere marɣafi irenux ?
(Will he come to-morrow?)

6. tere maryaji iren-baxa
(He will come to-morrow.)
7. noxai turëizi.
(A baby dog is born.)
8. ene noxai bul jehe.
(This dog is big.)
9. surhei noxai.
(A wonderful dog.)
10. minu degu bolbasu masi bayatur ere bolai.
(My brother is a very brave fellow.)

These are representations of the Mongolian sounds by means of phonetic symbols. It cannot be assumed, however, that the attempt succeeds in representing Mongolian speech with perfect correctness (the fact is that Mongolian pronunciation has not yet been thoroughly studied from the phonetic point of view and the pronunciation of a large number of words varies according as the words are in isolation or in compounds.)

The pitch and stress curves of No. 10 are given in Fig. 41 and for the rest of the sentences they are given in Fig. 40.

(a) In spite of the close relation between Mongolia and China, these being neighbouring countries geographically, their languages differ greatly in phonemes, word formation, phraseology, etc. In phraseology, Mongolian resembles Japanese rather than Chinese, in many respects. It has two different styles of speech, viz. the formal or literary and the colloquial or conversational styles. The pronunciation and accent slightly differ in these two cases. The material used in this book, however, is from the colloquial style.

(b) As will be seen from the diagrams mentioned on the following pages, the pitch varies very widely and correspondingly to the stress. Most words have the "peak of accent" on the final syllable, as is instanced in [minu], [masi], [bolbasu], [degu], [bayatur], [ere], [bolai], etc. in sentence No. 10; see Fig. 41-5. In description, however, the end of the sentence is slightly high-pitched.

(c) Mongolian is an agglutinative language, excellent examples being [xolda-nai] (1), [daba-nai] (2), [zun-teigus] (2), [yarči-baina] (2), [čida-nu] (3), etc. As in Japanese, the agglutinative form becomes a

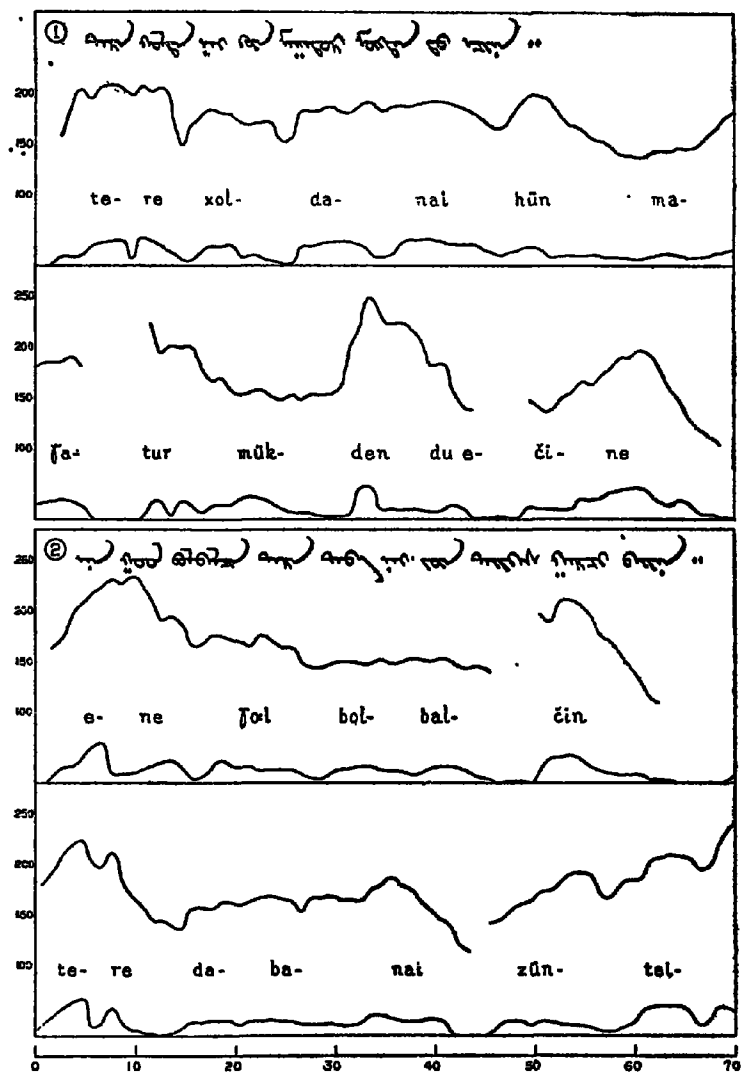


Fig. 40—1.

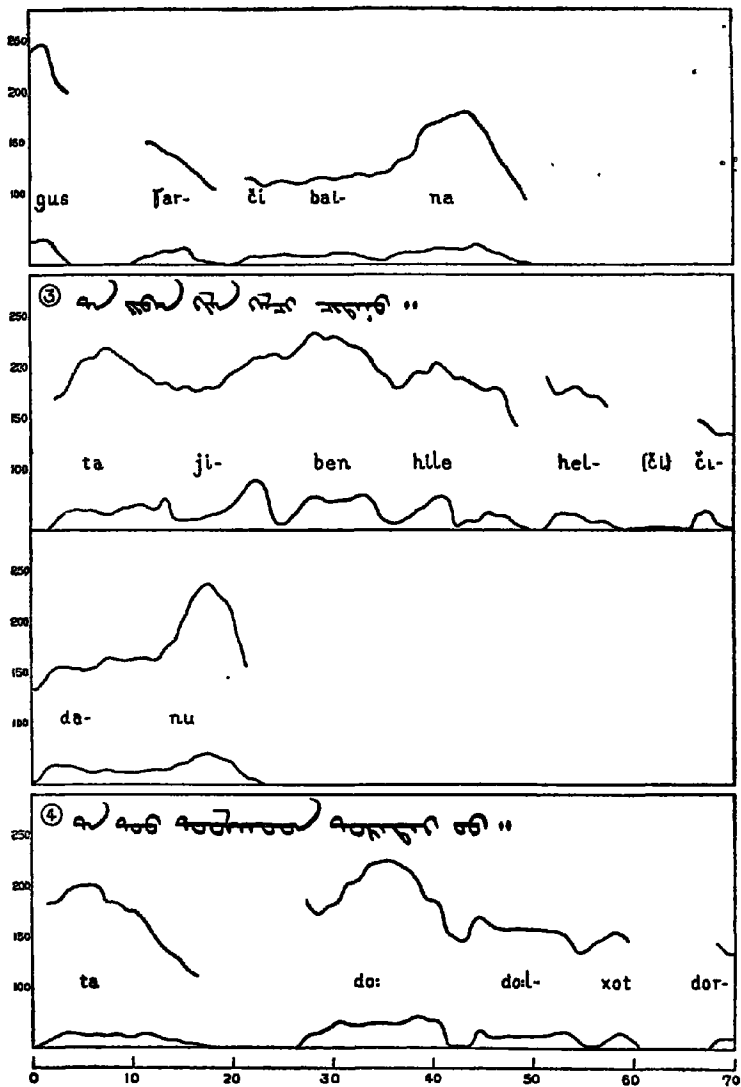


Fig. 40—2.

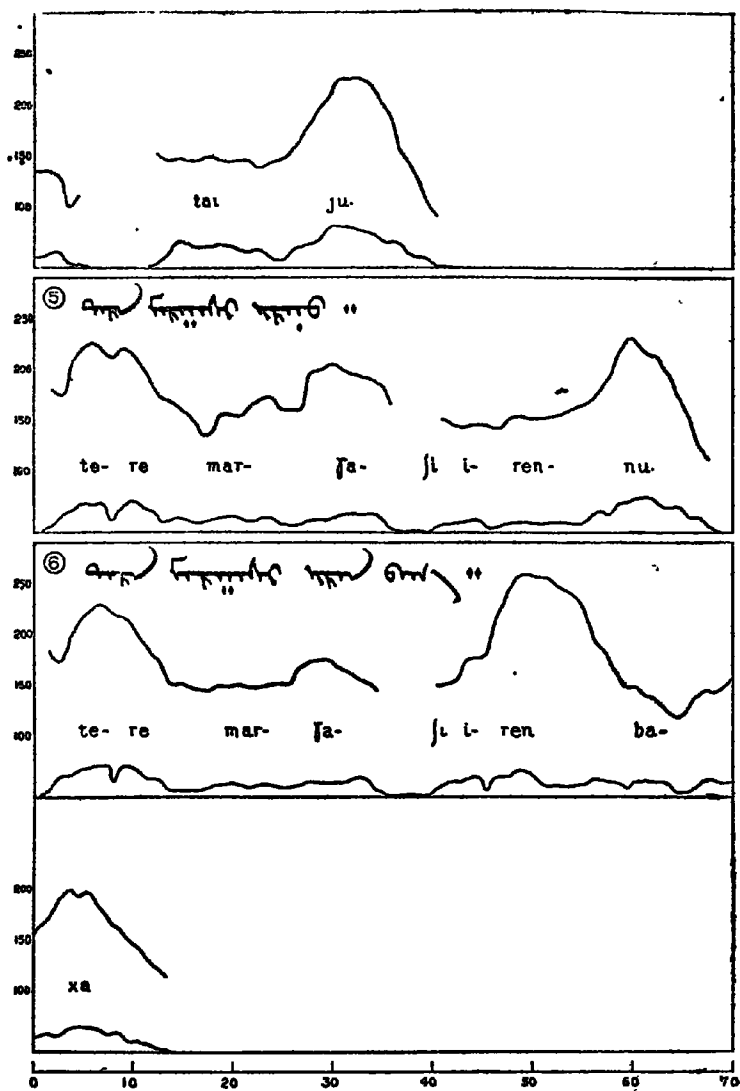


Fig. 40—3.

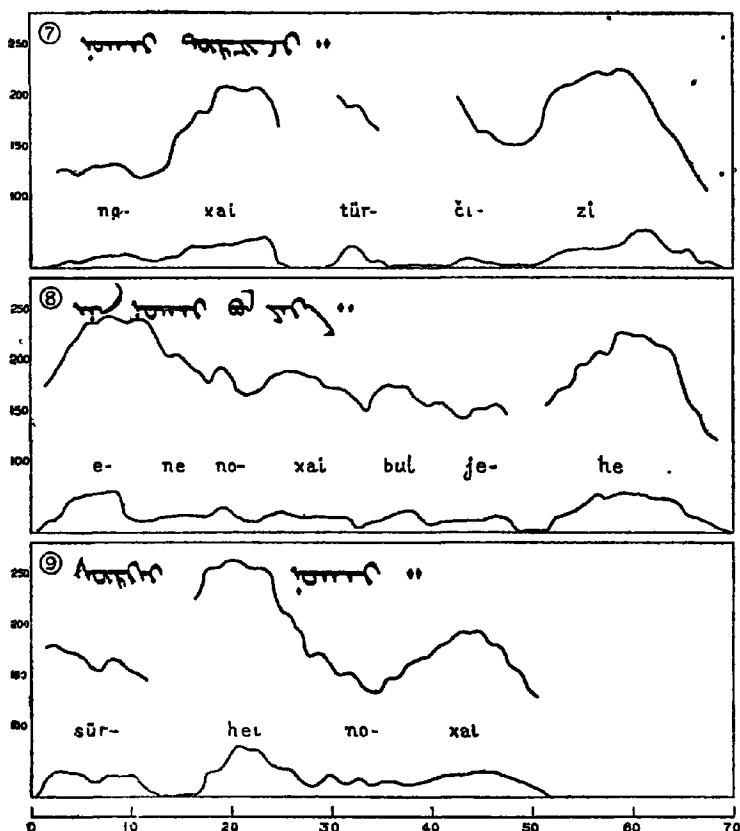


Fig. 40—4.

new accentual unit.

(d) The agglutinative compound is considered either as one unit or two units of accent according to the length. When treated as two units, the original accent of each component is retained in the compound form. But if treated as one unit, the accent of each element undergoes modification. The accent of [ire] in [iren-baxa] (6) becomes altered when [ire] is carried into [irenu] in No. 7. ([n] that occurs in [iren] in No. 6 has been attached for the sake of euphony, the root of the word being [ire])

(e) In questions, the interrogative words [nu] (see Nos. 3 and 5) and [ju] (see No. 4) are used. As has previously been described, the final syllable has a high pitch under the influence of accent in Mongolian with the result that in descriptive sentences too, the ending is high-pitched and the pitch is of mountain shape if represented graphically, just as in the interrogative. Only in the latter case, the rise in pitch is more or less abrupt.

(f) It has been pointed out that the final syllable at the "peak of accent" is higher in pitch than the preceding syllable. The degree of pitch, however, is not definitely fixed but varies according to the circumstances. For example, [noxai] is most prominent from the standpoint of accent in No. 7 and is less so in No. 9. Again in No. 8, the difference in pitch is almost negligible except that [no-] is uttered on a falling tone and is shorter than [-xai] which has a rising tone. That in each case a similar impression is produced, though more or less different in degree, is due to the common rise and fall in pitch. It should not be assumed from this, however, that the accentual peculiarities are lost sight of. In brief, we may say that the stress always varies proportionally with the pitch.

(g) Accent in Mongolian may be classified into several types according to the records themselves mentioned in the diagrams. Most of the words have the "peak of accent" on the final syllable. Thus in trisyllabic words the first two syllables are pronounced alike with level pitch, and the last syllable is higher still and its pitch-curve is of mountain shape. Examples: [bolbalɛin] (2), [čudanu] (3), [dortai ɣu:] (4), [tʉrɛzi] (7), etc. In [maɣatur] (3) and [baɣatur] (10), the second syllable is slightly higher and the corresponding syllable is specially high in [marafi]. The pitch remains nearly constant and only shows a slight terminal rise in [xolda-nai] (1) and [daba-nai] (2).

Furthermore, in some dissyllables, the first syllable is on a level or falling tone and the second is high in pitch, its pitch-curve taking a mountain shape. Examples: [mukden] (1), [baxa] (6), [noxai] (7, 8, 9), [jehe] (8), [surhei] (9), [degu] (10), [masi] (10), etc. As is instanced in [jiben] (3), [minu] (10) and [ere] (10), other dissyllables have a rising pitch on the initial syllable. In [tere] in Nos. 1, 5 and 6, and [ene] in Nos. 2 and 8, the initial syllable is uttered on a rising tone and the final on a falling tone. The initial syllable is stressed in [ene].

(h) From the records given above, Mongolian may be called a language with "pitch and stress accent", since the pitch always varies proportionally with the stress. A more detailed study, however, shows that the pitch rather than the stress is more characteristic of the language. This is why I have classified the accent according to pitch. That the stress does not necessarily remain constant will be noted when one hears Mongolian spoken in a low voice: viz. whereas the pitch invariably rises in terminal positions, the stress falls as often as not on the initial rather than on the final syllable. (All Hindustani words have a terminal rise, but there is in no way a close connection between the pitch and stress. Immutability is observed in the stress which is characteristic of the language.) From this, Mongolian can be said to be a language with "pitch accent".

Japanese and Mongolian have much in common in phraseology and in *qualities* of accent, but they differ entirely in *types* of accent. In tonal impressions, Mongolian is very much like Chinese, its syllables being long and giving an impression of much composure.

CHAPTER IV

THE SCOPE OF ACCENT

IV. 1. The Origin and Nature of Word Accent.

However correctly the sound itself may be produced, the stress and pitch elements cannot pass unnoticed. If the same word is uttered with a high pitch on the initial syllable by some, and on the final syllable by others, a great deal of inconvenience will be experienced, since the language is essentially intended for purposes of communication. Accordingly, within one community in which the same language is spoken, some sort of uniformity has been reached with regard to pitch and stress and they have gradually been fixed in certain forms. Neither pitch nor stress, however, need always be fixed at the same time, for if either is fixed, words can be differentiated from one another. Hence the difference between pitch accent and stress accent.

The accent occurs in any language even when there is no difference in pitch and stress between syllables and neither rise nor fall takes place (in this case the term "level accent" may be used). In consequence, to say that the word has no accent means that it is devoid of any peculiarities in tone at all, and that as far as pitch and stress are concerned, whatever pronunciation is used should be accepted as right and good. It should be remembered, however, that some words have no accent at all by nature, the Japanese interjection *so* being an excellent example. We are quite unable to recognize in the word any definite form of accent, since various shades of meaning can be expressed by changing the degree of pitch and stress.

IV. 2. The Definition and Scope of Accent.

The apportionment of pitch, stress and intonation among syllables of a word is usually termed "syllable accent". This is undoubtedly because the accent stands for the "emphasized sound". Since, however, in our definition of "accent", we are concerned with the form of a whole word, as viewed from the standpoint of tone, and we are not concerned with the stress on one syllable, only the term "word accent" should be preferred. ("Word accent" will hereafter be understood in the sense of what is

usually termed "syllable accent".)

In like manner, an attempt will be made to learn whether accent is possible in a combination of more than two words, or in a complete sentence. Furthermore, if "accent" of this kind is at all possible, a study will be made of its nature.

IV. 3. Collocation Accent.

When two or more than two words are combined to express a certain definite meaning, and the combined form is used repeatedly, we shall have a fixed form of accent on the combination. For example, in Japanese *rikō na kodomo* or clever child and *akai hana* or red flower, certain fixed pitch relations are observed between the first and second elements of these combinations. Namely, we have pitch accent in combining the adjective with the noun. This may be termed "collocation accent". It has previously been illustrated by the example of *hanaga kireida* that accent in a collocation is created where the noun and the auxiliary particle are combined. In English, too, when adjectives are used for contrast, we have a similar relation between adjectives and nouns, of which the former are generally higher and stronger than the latter. Furthermore, a kind of "collocation accent" is often created in the combination of articles and nouns.

The fusion in that mode of combination of more than two words which has been treated above, seems to be less intimate than in the case of two words together forming what is quite a new word with a single new idea. For example, Japanese *kado* or gate and *matsu* or pine together form *kadomatsu* or New Year's pine-tree decoration, and *me* or eye and *hana* or nose *mehana* in the composite verb *mehanaga tsuku* or to get in shape. Such composites denote a single new idea rather than the combination of two ideas suggested by the component elements, and this leads in many cases to a different form of accent from that of the accent of the original words. The ordinary compound can be distinguished in this respect from the collocation. English *greenhouse*, *bluebottle*, *good-natured*, *ill-tempered*, *harelip*, etc. are, among others, good examples of ordinary compounds, which are found in several parts of speech.

The pitch-stress relation between the adjective and the noun, the noun and the auxiliary particle, or the article and the noun in Japanese and

English have already been treated with in the preceding paragraphs. With a view to studying accent in collocation in other languages and of the variant forms of accent in these different languages, a sentence to the effect that "my brother is a very diligent person," is put into English, German, Dutch, French, Italian, Spanish, Japanese, Korean, Mongolian, Chinese and Malay as in the following. The records have been made of the resulting sentences pronounced in standard pronunciation of their respective languages. In the Italian sentence, "younger brother" has been replaced by "younger sister", and in German, Dutch, Italian, Spanish, Mongolian and Chinese, "brave" has been substituted for "diligent".

As they belong to the same family, English, German and Dutch have much in common in the structure of sentences, as have the Romance languages, French, Italian and Spanish, for the same reason. Of Oriental languages, Japanese, Korean and Mongolian are grouped under the same category, but Chinese and Malay differ from any of the above-mentioned.

1. *My younger brother is a very diligent person* (English).
2. *Mein jüngerer Bruder ist ein sehr mutiger Junge.* (German).
3. *Mijn jongere broer is een zeer dappere jongen* (Dutch).
4. *Mon frère cadet est un garçon très appliqué* (French).
5. *Mia sorella più piccola è una ragazza molto brava.* (Italian).
6. *Mi hermano menor es un muchacho muy valiente.* (Spanish).
7. *Watakushi no otōto wa hayō ni kinben na otoko desu.* (Japanese).
8. *natı au nın pök kun mjun han sa lam io.* (Korean).
9. *minu degu bolbasu ması baʼatur ere bolai* (Mongolian)
10. *uo³ ti¹ ʃiuŋ ti¹ j⁴ i² kə⁴ iuŋ³ kan³ nan² ts¹.* (Chinese)
11. *adik saya seorang anak yang berani* (Malay).

The relation of pitch to stress in these eleven sentences is represented in curves in Fig. 41. The English *younger brother*, German *jüngerer Bruder*, and Dutch *jongere broer*, though all are of the same linguistic family, have different forms of relative pitch and stress of the adjective and the noun. For instance, in English, the former is stronger and higher, in German the two have the same degree of stress, the latter, however, being higher in pitch. Again, in Dutch, both are uttered with the same degree of pitch, but the latter excels in stress.

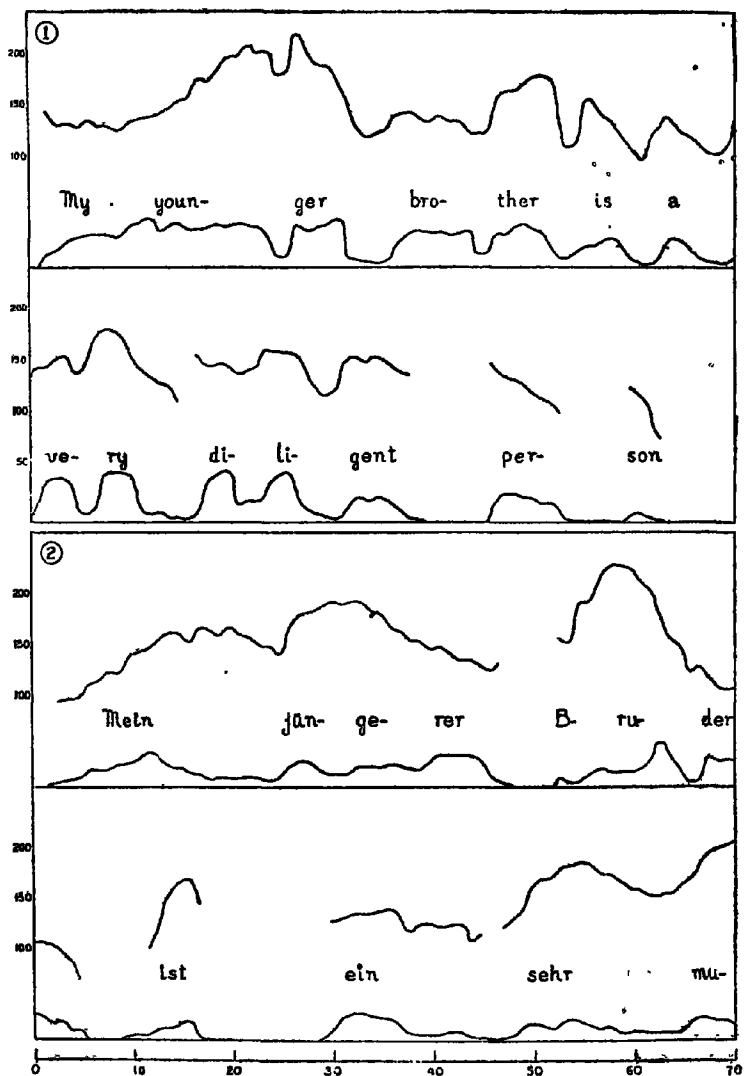


Fig. 41—1.

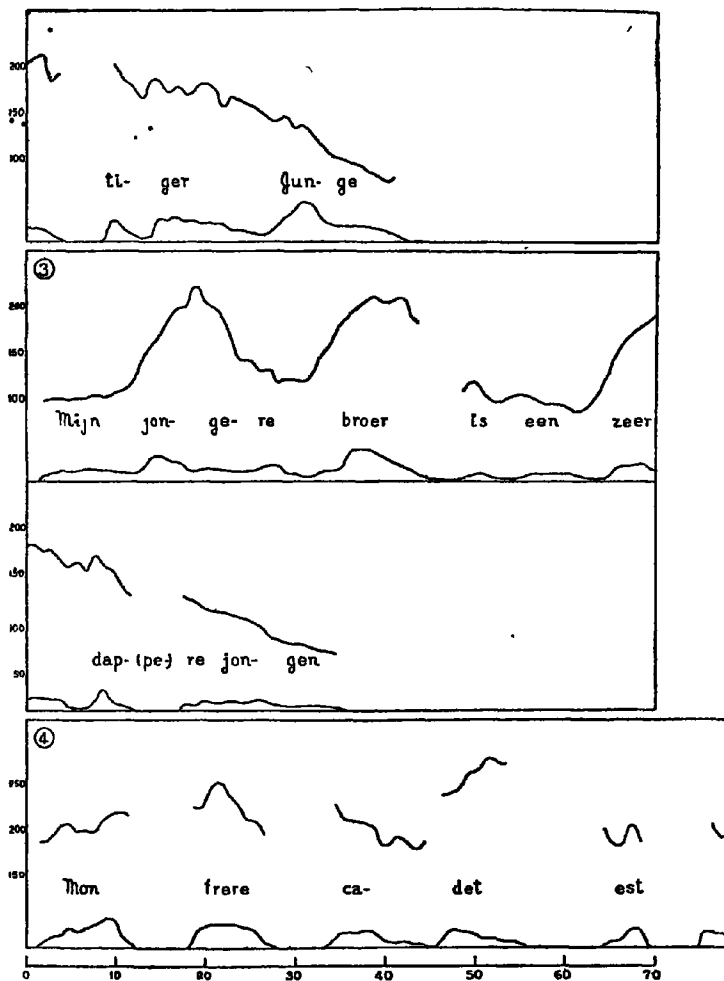


Fig. 41—2.

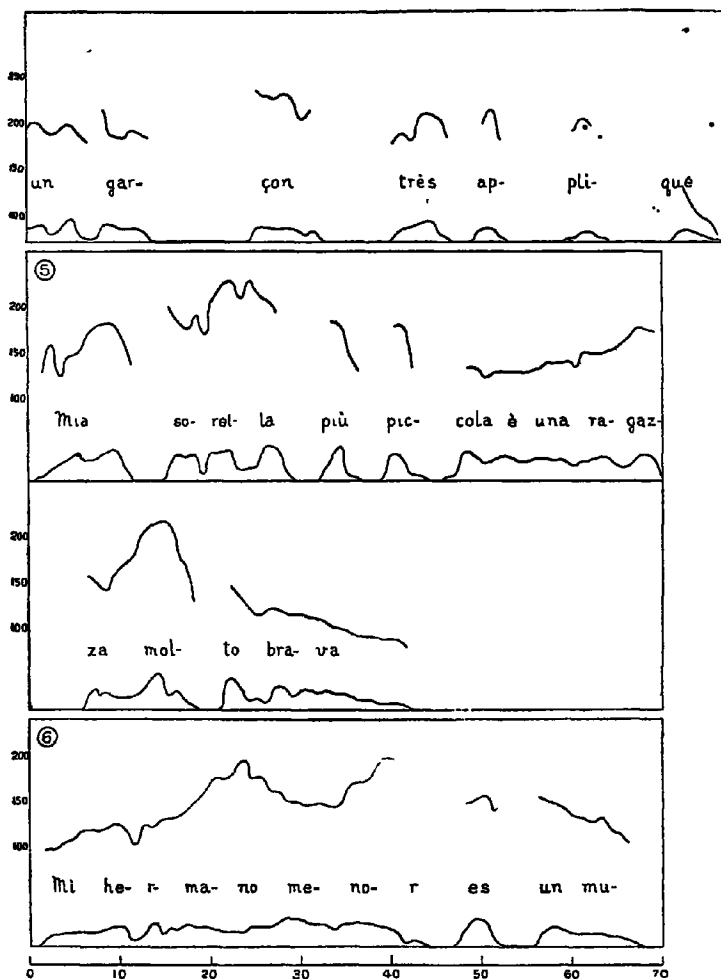


Fig. 41—3.

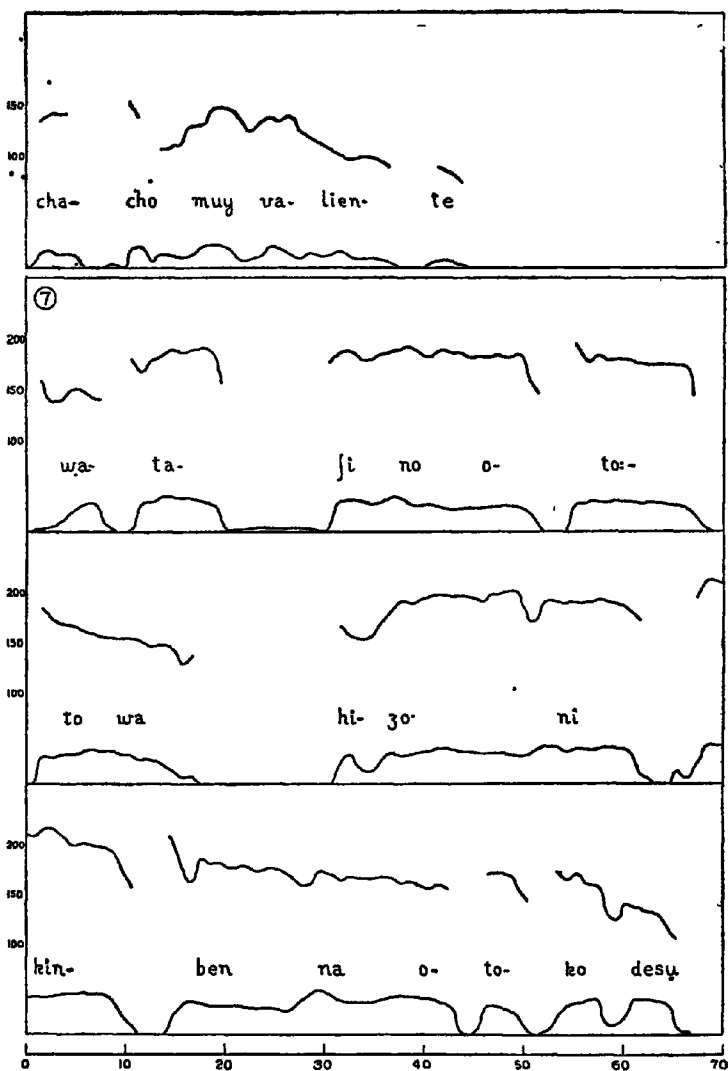


Fig. 41-4.

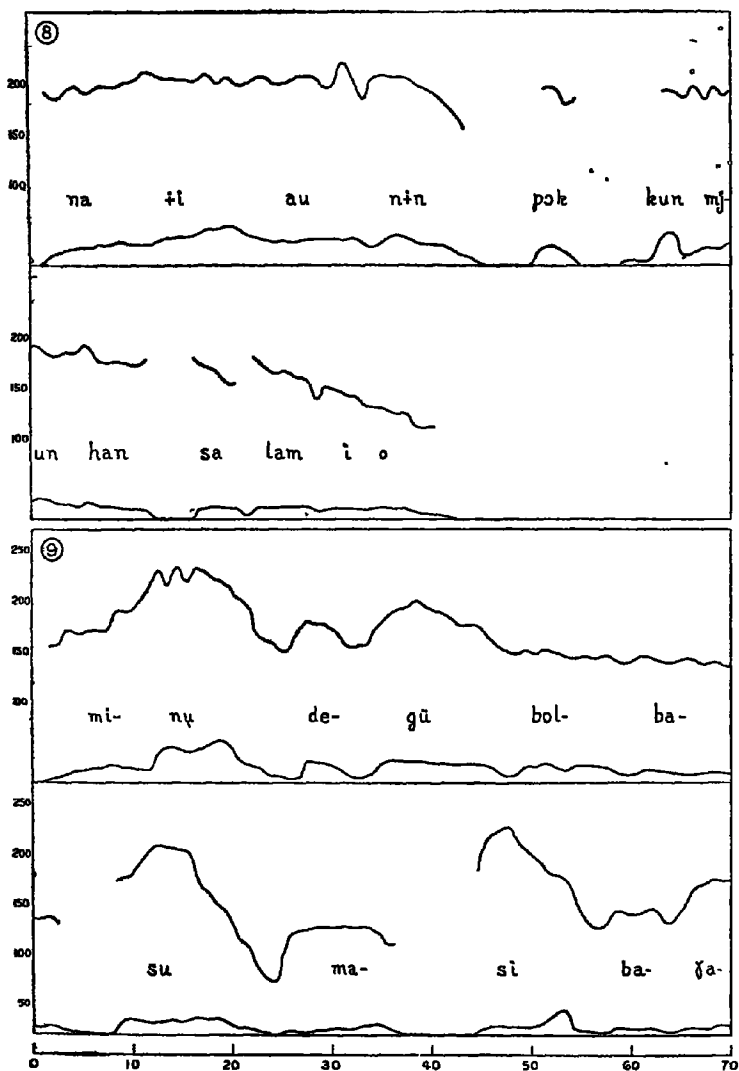


Fig. 41—5.

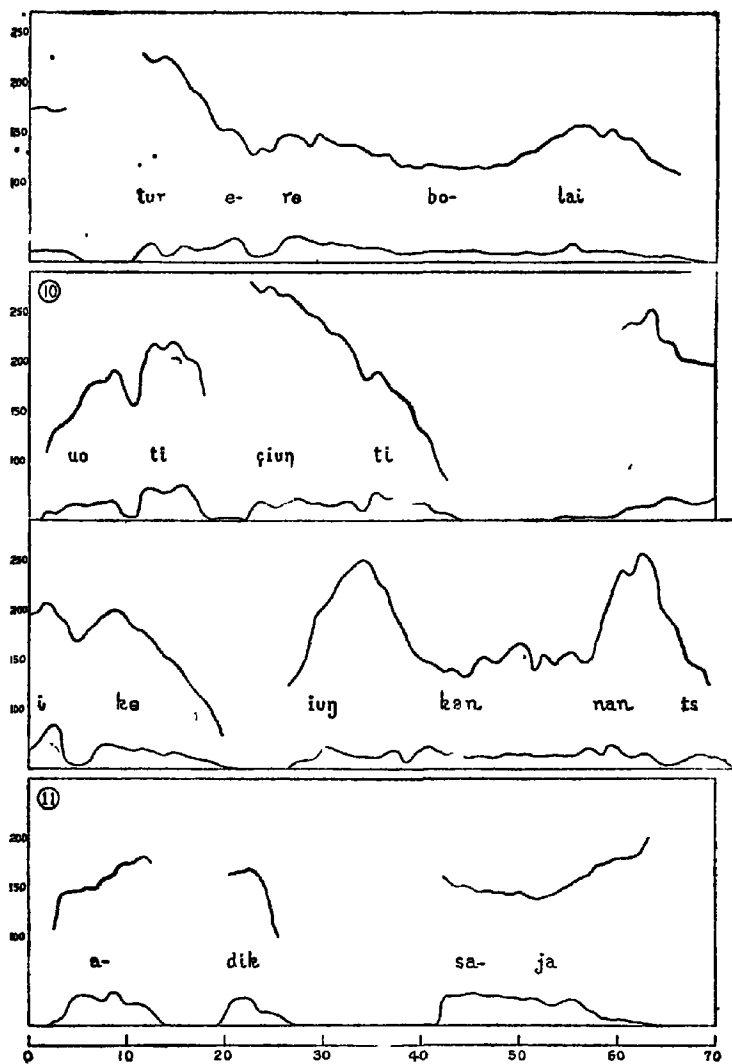


Fig. 41—6.

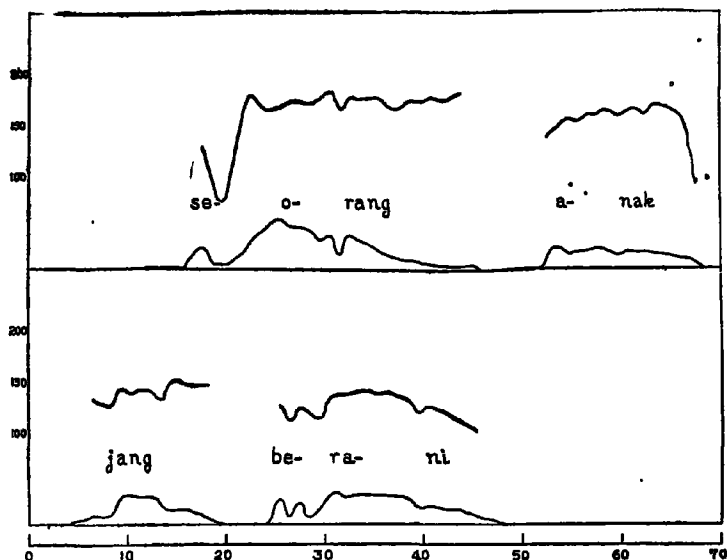


Fig. 41—7.

When the adjective is preceded by the noun as in French, Italian and Spanish, the former is stronger and higher in Spanish, weaker in French and lower-pitched in Italian. The relation between the adjective and noun in *diligent person* or *brave person* that is in the terminal position in the sentence, is different from that between the adjective and noun in the initial *younger brother*. In English, the pitch and stress occur in the same order both in the initial *younger brother* and the final *diligent person*, but in German *Bruder* is higher than *jüngerer* and *Junge* is lower, though stronger, than *mutiger*. The adjective is lower and weaker in Dutch. The reverse is the case with Spanish, but the difference in pitch and stress is here relatively small. And in French and Italian, the regular order is on the whole comparatively well maintained. *Diligent* and *person* are pronounced with much the same degree of pitch and stress in Japanese, Korean, Mongolian, Chinese and Malay.

Whereas in Dutch *mijn* is the lowest and weakest element in the sentence, the corresponding word in Mongolian is the highest and the strongest. In English, Japanese, Chinese and Malay the pitch as well as the

stress is medium. The stress is also of medium degree in German and Spanish, but the pitch is slightly below the average. In French and Korean, on the other hand, the pitch is medium with greater degree of stress. The remaining words such as the verb, article and auxiliary particle, etc. have their respective forms of pitch and stress. All this will be summed up in tabular form on the next page.

The Hindustani sentence of the same meaning has not been recorded. But in this language, the difference in pitch and stress between the adjective and noun in the combination such as [la:kəpɾa] (red cloth) and [atʃʃa:ləɾka:] (good boy) is almost negligible, except that the rising interval of the adjective appears to be a little greater than that of the noun. Normally, the conjunction such as [aur] (then), [ləɾkin] (but), etc. is lower than any other word in the sentence.

In this way, not only in the languages of different families and systems but also in those of the same family and system, there are wide divergences from language to language in pitch and stress of the corresponding word in the sentence of the same import and phraseology. The reason is perhaps this: the distribution of weight over words is influenced not so much by the purport and contents of the sentence as by the force of custom. It should be borne in mind, however, that the weight given to individual words undergoes modification by the tone of the sentence as a composite whole.

The signs ○, △, × given on the next page indicating a predominant syllable in each word, stand respectively for high, medium and low pitch, and strong, medium and weak stress. The pitch is given on the left and the stress on the right in the same column.

IV. 4. Sentence Accent.

With a view to the research into the existence and nature of sentence accent, speech-dimensions should first be considered, and further observations may be facilitated by defining in the most appropriate words various terms that are necessary in the following sections.

Preliminary to discussing the substance of the subject, definitions will be given as to two technical terms that will be used hereafter. These are (i) *Expression*: by Expression is meant the pitch, stress and speed

	my	younger	brother	is	a	very	diligent brave	person	
	pitch stress	pitch stress	pitch stress	pitch stress	pitch stress	pitch stress	pitch stress	pitch stress	
English	△ △	○ ○	△ △	× ×	× ×	△ ○	△ ○	× ×	
German	× △	△ △	○ △	× ×	× △	△ ×	△ ×	× ○	
Dutch	× ×	○ △	○ ○	× ×	× ×	○ ×	△ △	× ×	
	my	brother	younger	is	a	person	very	diligent brave	
French	△ ○	○ ○	○ △	△ △	△ △	△ △	△ △	△ ×	
Italian	△ △	○ △	△ △	△ △	△ △	△ △	○ △	× △	
Spanish	× △	○ △	○ ○	△ ○	△ △	△ △	× △	× ×	
	I(my)	(g p)*	brother	(n p)**	a	very	diligent brave	person,	is
Japanese	△ △	△ △	△ △	△ △	—	△ △	○ △	△ △	× △
Korean	△ △	△ ○	△ △	△ △	—	△ △	△ △	× ×	× ×
Mon- golian	○ ○	—	△ △	△ △	—	△ △	△ △	× ○	× ×
Chinese	△ △	○ ○	○ △	○ △	△ △		○ ×	○ ×	—
Malay	△ △	—	△ △	—	○ ○		× △	△ ×	—

* g p. Genitive Particle.

** n p. Nominative Particle.

of the voice, with which a certain sentence is to be uttered.

(ii) *Pattern*: When two sentences have the same parts of speech arranged in the same order, syntax-pattern is said to be the same.

Speech-dimensions are three in number.

(a) First, those sentences which are the same in form, i.e. with the same pattern, and which express the same "abstract contents", though formed by different words, can be represented by a straight line stretching in the direction of "O—A." (By "abstract contents" are meant thoughts and emotions.) See, Fig. 42. given on the next page.

Examples:

This is his book.

That is her pet.

They are my children.

These word-groups are of the same pattern, and at the same time they are said to have the same tone of speech, i.e. sentence accent of the same type, phonetically speaking.

By sentence accent is meant the tone common to those word-groups which express, with the same syntax-pattern, the same "abstract contents"; in other words, a definite combination of pitch, stress and variation of speed within connected speech. (Sentence accent is subject to variation to a greater or less degree according as the accent of the component words varies.) In this way, the definition of sentence accent becomes identical with that of word accent in the sense that accent is a tone peculiar to a given word, phrase or sentence, by which the significance and contents of the word, phrase or sentence are made known to the hearer more directly and more precisely.

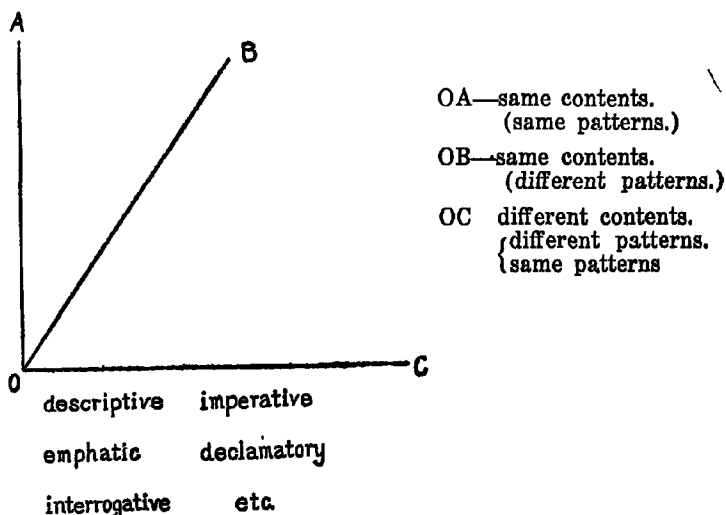


Fig. 42.

It very often happens that dialects are hardly intelligible when spoken, though they are fairly intelligible when written. This is chiefly because we are little accustomed to the tone of speech, i.e. sentence accent, typical of the dialect of a certain district. Even those in districts where a dialect is used, who have been carefully taught to read standard Japanese, may find it difficult to understand standard speech when it is spoken by educated Tokyo people. It is perhaps for the same reason that we can only with difficulty follow foreigners speaking their native tongues, while we can fully understand the corresponding languages spoken by Japanese.

Speaking generally, those word-groups which have a common syntax-pattern and expression, viz. which are on the same straight line in the direction of "O--A" in the diagram of speech-dimensions are uttered with sentence accent of the same type. Accordingly, the corresponding constituent units of these word-groups, viz. those words which belong to the same part of speech, occupy the corresponding position and have pitch and stress of the same degree in the sentences consisting of equivalent word-groups. When these constituent units are repeatedly used, combined with the preceding and subsequent words, the forms of pitch and stress in them tend to become fixed, and we have then what may be called "collocation accent." In the case of conjunctions, we have no definite part of speech to combine with them. They are the words that are usually lower and weaker than those which precede or follow them, and in this instance, too, a kind of "collocation accent" occurs. Where sentence accent and "collocation accent" conflict, the former usually prevails. For example, in description or narration, the fall generally takes place at the end of the sentence; but in Dutch and Spanish in the list of the eleven languages dealt with in the previous section, when a combination of a noun and adjective with "collocation accent" comes at the end of a sentence, the noun is weaker and lower than the adjective where the contrary usually prevails.

In German, the "collocation accent" is sometimes so flexible as to make up for the fall in pitch by the increase in stress. In fine, although it goes without saying that different languages have different degrees of immutability in accent, accent can be arranged, according to the degree of immutability, into (1) word accent, (2) sentence accent and (3)

phrase accent.

(b) Secondly, those sentences which have the same abstract contents, though their syntax-pattern is different, can be arranged on the same straight line as "O—B" direction in the diagram of speech-dimensions. See Fig. 42. For instance, two sentences, *This is his book* and *This book is his*, no doubt give expression to the same concept. In addition to those, can be given the following sentence with the same abstract contents: *This desk and that chair have been given by him to his brother*. Though the sentence *Cherry blossoms are beautiful* is analogous with those given above in so far as it is descriptive, all these sentences express different kinds of feeling, and cannot be said to express the same abstract ideas.

(c) Thirdly, those sentences which differ in abstract contents are indicated by "O—C" direction in the diagram of speech-dimensions; see, Fig. 42.

Difficult as it is to name in a sweeping manner all kinds of such contents, they are broadly divisible into: (1) descriptive; (2) emphatic; (3) interrogative; (4) imperative; (5) declamatory, etc. Sometimes the sentence falls strictly under one of the above heads, or sometimes comprises more than two, a delicate difference in tone being observed between the two instances.

In order to give expression to different contents, different syntactical patterns are adopted, to each of which is attached such a tone of speech, i.e. sentence accent, as is most suitable for the contents.

As to how sentence accent varies with different contents, no thorough investigations seem to have been made. It has only been pointed out so far that the end of a descriptive sentence is generally uttered on a falling tone and that the pitch rises finally in a question that requires the answer "yes" or "no".

One and the same sentence has occasionally different shades of meaning according to different modes of expression, i.e. intonation. For instance, *sō* is differently uttered by changing the pitch, if we leave stress in the background for the moment. It may be said with a sudden fall, sudden rise, level tone, rise, fall, rise-fall, fall-rise, or rise-fall-rise. Such devices for producing the same sentence with different forms of intonation are

widely resorted to, especially in the English language. According to Mr. Palmer, twelve different meanings are possible for the sentence *I don't know*, and sixteen for *Horses are strong*. In many cases, we quite unconsciously make constant use of the device of expressing the same sentence differently. Closer inspection will surely prove that such is more widely resorted to than we imagine. All this is a phenomenon springing from delicate mental activity. In this connection, a word may be said on the change of relative pitch and stress, as effected by emphasis.

As is shown in Fig. 43 given on the next page, special emphasis is laid on *that* in *That man is strong* in (A), and *man* is emphasised in (B) to distinguish it from *woman*, *boy*, etc. In (C) and (D), *is* and *strong* are emphasised respectively to call attention to the fact of being strong.

In (A), as is illustrated in (ii) in the section of sound psychology, a sudden rise in pitch and a sudden decrease in stress occur on *that*.

That in (B) and (C) have an analogy to *that* in (A) in the rise of pitch, but differ from the latter in the relation of pitch to stress, belonging to the category of (iii) or (iv) also given in the section above-mentioned. In short, *that* in (A) gives an impression of prominence. And in this case, *that* is stronger than *man* under the influence not of emphasis, but of "collocation accent". (This will clearly be understood if you compare them with *That* and *man* in (D).) *Man* is slightly stronger in (B) than in (A) and is uttered with much the same degree of stress as the preceding *that*, but is lower and much longer than the last-named.

In (C), *is* is the highest and strongest, which shows that the word does not form any "collocation accent" in combination with *man* or *strong*.

The first three words, i.e. *that*, *man*, and *is*, in (D) make for monotony in pitch; and *strong* is slightly stressed at the end of the sentence.

From what has been said, we see that these four types of emphasis have been effected in quite different manners. This is because the effect of emphasis has been assorted according to the extent of deviation from the commonest standard expression, on condition that "collocation accent" be preserved. "Collocation accent" in *that man* is attained by pitch and stress in (A) and by pitch alone in (B).

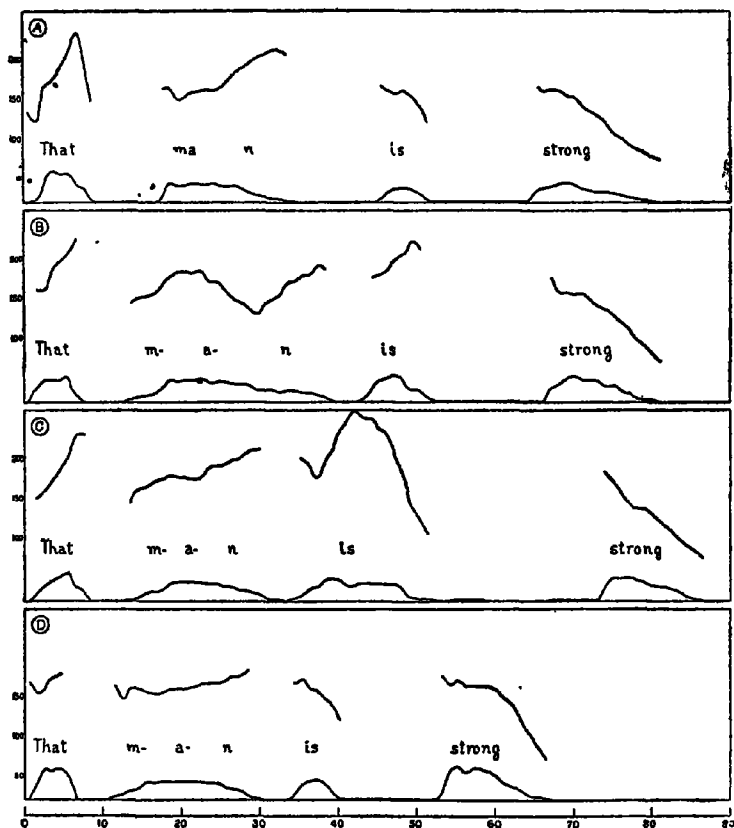


Fig. 43.

Thus, one and the same sentence may be expressed differently by different intonations. It should be noted, however, that intonation is not an arbitrary thing. As noticed in the previous examples, intonation is subject to control, as it were, by phonetic agreements or usage made enforceable within the scope of each language. Supposing that *Horses are strong* can be expressed in sixteen different ways, all the sentences with the same word order will likewise be furnished with sixteen modes of expression. In other words, there will be sixteen definite types of expression common to all of them, from which will result sixteen forms of

sentence accent. These observations may lead us to think that there are innumerable forms of sentence accent, but this is not really so. Those forms of sentence accent which are in common use are comparatively few in number. For not only short sentences with the same abstract contents and the same syntax-pattern have sentence accent of the same type, but also those with different modes of word order. In longer sentences, too, some types of sentence accent are only extended forms of what occur in shorter ones, while others are combinations of different types of them, with the result that these can be reduced to a relatively few fundamental types. When one and the same sentence has different shades of meaning according to its intonation, more than twelve or sixteen forms of sentence accent are attached to the one single sentence. We have then one "fundamental tune" or "tune in commonest use" on the one hand, and a large number of "off-shoot tunes" on the other. Certain principles seem to be at work when a great many "off-shoot tunes" spring from the "fundamental tune". For instance, in *That man is strong*, *that mən* bears "collocation accent" so that *man* cannot be uttered with a higher pitch and a stronger stress than *that*, even though emphasis is required on *man*. We escape from the dilemma, however, by lengthening the sounds in *man*. In this way, although there are quite a number of "off-shoot tunes", they can after all be formulated by the combination of a few "rules". Similarly, whereas Chinese monosyllables have only four types of accent, the number of the types of accent amounts respectively to sixteen and four-and-sixty in dissyllables and trisyllables. In fine, it may be asserted that Chinese accent can be reduced to four fundamental types. "Tunes" and "rules" are not entirely different things, and may be regarded as identical from a certain point of view. In the present study, however, they will be considered, for convenience, as independent. In English, the "fundamental tunes" are formed by "types", and the "off-shoot tunes" by "rules". Nearly all types of sentence accent are created by "rules" in French and by "types" in Russian. But some languages such as Hindustani are devoid of either "types" or "rules". As has been explained, a good many forms of sentence accent are attached to one single sentence in English, but in French it is customary to express different contents by different modes of syntax-pattern without resorting to the device of "expressing the same sentence differently". In this respect, Japanese seems to resemble French, which may explain in some small measure, the relative

facility with which Japanese learn to pronounce French as compared with English.

Needless to say, in any language, expression of sentences is not at all free from the influence of individuality or of personal mood and manners, even if it still remains essentially identical. From this point of view, it may be said that there is a certain sphere of allowance for individual differences and variations.

Strange impressions are made upon the mind of hearers when the limit of allowance in standard sentence accent is exceeded. Such anomalies often tend to become fixed in the speech of individuals. We have then the so-called "provincial accent" (including of course word accent). This "provincial accent" occurs when people speak in languages other than their mother-tongue, or in the speech of other districts to which they are little accustomed: e.g. English with a German accent; Tokyo speech with a Kyoto accent, etc. When Germans speak in German or people in Kyoto in a Kyoto accent, they do so with the accent typical of the country or locality so that there is no "provincial accent" here. Within one country, however, such provincialism is called dialect, as distinct from a standard form of speech. Speaking generally, "provincial accent" includes not only the "tone-element" but also the "phoneme-element".

IV. 5. Accent of French.

The distribution of stress over French syllables varies only very slightly with different parts of speech, but wide divergencies are observed in pitch in similar circumstances. For example, less important words in a sentence such as articles and conjunctions are normally lower in pitch than the other words of the sentence.

When a French word is uttered in isolation, the pitch rises on the final syllable with the simultaneous increase in stress—one of the characteristic features of the French language. In connected speech, on the other hand, the last syllable of a word that forms a rising sequence of notes in the sentence is said with a high pitch but becomes slightly weaker; and when the word is uttered as a falling sequence, the corresponding syllable is low in pitch but strong in stress. In both cases, the final syllables tend to be pronounced long. Whether said in isolation or in connected speech, the final syllable gives greater psychological impressions than the preceding ones, viz. it has greater sonority—a phenomenon common to

both instances. From this, and in view of the fact that pitch and stress lack immutability, French accent may be termed "sonority accent". In German, flexibility such as noted in pitch and stress is a phenomenon that accrues from the clash of "collocation accent" with "sentence accent." In French, on the other hand, word accent changes according to sentence accent.

French, in which there is no remarkable immutability in word accent, and in which sentence accent is dominant, contrasts strikingly with English with its many and varied forms of sentence accent. Just as English "collocation accent" involves both pitch and stress elements, so also French word accent has the two elements. It is, therefore, a matter of considerable difficulty to determine once and for all whether French is a language of pitch accent or of stress accent. If there should be any need to choose among terms other than "sonority accent" given above, the term "flexible stress-pitch accent" would be preferable.

IV. 6. Time in Accent.

(a) The objective sound attributes that give impressions of tone to hearers are pitch, stress and length. When the pitch is more or less fixed we have pitch accent, and in like manner we have stress accent when the stress is determinate. The question is whether or not the same is the case with length.

Needless to say the human voice has no absolute pitch and stress. However, just as in speech of the same style we have medium pitch and stress in the respective cases of the voices of men, women, old men, and children, so also we have medium speed in speech. Any speech outside this medium or standard speech, either faster or slower, cannot be said to be normal.

If we play a gramophone record of a lecture delivered in a grave tone and increase the speed of the disc to 1.3 times the regular speed, the tone becomes frivolous. Within this limit, however, it will not sound unnatural. But if the speed is further increased to over 1.7 times, the speech as a whole will come to sound quite unnatural, even though it will still be understood distinctly. To increase the rotary speed of gramophone records means to lift up the pitch of the voice, to shorten the duration of speech and intervals between words and to make abrupt the change

in pitch. All this certainly exercises a great influence upon the tone of speech.

From this it may be noted that length of sound is no absolute thing and is capable of change according to tone and intonation and that when we describe vowels as being long or short, we do not mean that there is any definite length to qualify them as long or short. But subjectively the long vowel is always clearly distinguished from the short one so that when these sounds occur in connected speech they can be of any length. For instance, the subjective discrimination between long and short vowels is present even where a long vowel in rapid speech is shorter than a short vowel in slower speech.

(b) The vowel in a monosyllable is sometimes pronounced rather long, but the short vowel contained in a polysyllabic word is seldom pronounced long inasmuch as it has to keep up relative length as against other vowels in the same word. For example, the word *book* is sometimes pronounced long, but *book* in the compound *bookkeeper* is usually short. Furthermore, monosyllables in languages of stress accent are sometimes stronger and sometimes weaker than the preceding and subsequent words, but in words of more than two syllables, the stress is relatively fixed as between component syllables. There seems to be, in my opinion, a more or less close correspondence between the two phenomena.

Accent may further be considered from the standpoint of the time element of tone. However, since the accent of this type is common to almost all languages and the length of vowels can be compared more favourably with the kind of phonemes, there seems to be no special need for the term "length accent". Only it should be borne in mind that the subjective form of words includes as important factors, not only stress and pitch but also length.

(c) Inasmuch as the long vowel is more sonorous than the short one, the "betonte Silbe" is longer than the "unbetonte Silbe" in French, a language of "sonority accent", and in Russian, a language of "stress accent". This is also the case with some German words such as *jeder*, *liebte*, *über*, *Hügel*, etc., in all of which the vowel in the "betonte Silbe" is close. It may be concluded that after all length has only a supplementary significance in languages of "sonority accent".

IV. 7. Accent Peculiarities of Various Languages.

In the foregoing, I have classified the accents of various languages into the three kinds of pitch, stress and sonority accent according to the characteristics of pitch and stress in speech-sound. The classification is made chiefly on the basis of immutability of the three sound attributes. Of course, it is admitted that those classed as languages of "pitch accent" or of "stress accent" differ greatly within the group, hence any hasty conclusion should better be avoided. For example, despite the fact that the stress is determinate, the "accented syllable" in Russian is made prominent by means of pitch.

Below I make a general survey of the characteristic features of accent in various languages so as to facilitate understanding.

Pitch accent:

1. Chinese.
2. Japanese.
3. Korean.
4. Mongolian.

Stress accent:

5. Russian.
6. German.
7. English.
8. Hindustani.

Sonority accent:

9. French.

1. The accent of Chinese has a most distinctive *raison d'être*. In Chinese, the pitch takes four forms, i.e. level tone or ㄆㄣˊ pín, sudden rising tone or ㄆㄣˊ pín, level-rising tone or ㄆㄣˊ pín, and falling tone or ㄆㄣˊ pín, by means of which the monosyllabic words are distinguished from one another.

2. Japanese is also a language of "pitch accent". Its pitch accent is comparatively well fixed, which is characteristic of its word accent as well as its collocation accent. Maybe, all this is due to the structure and phraseology typical of the language.

3. Although Korean *prima facie* resembles Japanese, further detailed studies will be needed before we can arrive at any definite conclusion as

regards the subject. In Korean, too, the stress varies but slightly between neighbouring syllables, but there may be observed a considerable difference in stress throughout the sentence.

4. In Mongolian, the pitch changes proportionately with the stress; and the final syllable is generally strong and high. And the degree of pitch and stress largely depends upon the position of words in the sentence. Taking this into account, Mongolian cannot instantly be defined as a language of pitch accent in the strict sense of the term.

5. Stress is determinate in Russian. The "accented syllable" in words that form a level or rising sequence of notes in the sentence rises invariably. But the syllable is not always stronger than others.

6. In German, stress is pretty well fixed. As illustrated in section 4, Chapter III, with the exception of "Uhu" uttered with nearly level accent, the ratio of stress between two syllables in the dissyllables that twice occur in the dialogues, remains on the whole unchanged. This phenomenon may also be recognized in other languages of stress accent, but in German pitch also typifies the language. The characteristic features are more fully exhibited in the rise and fall of tone than in the degree of pitch. For example, in *gehört*, *ge-* has a falling tone, and *-hört* a rise-fall. In some syllables on the contrary such as *über*, the so-called "betonte Silbe" is weaker. To take a general view, therefore, the element of pitch may be said to figure in German accent.

7. The order of stress among English syllables is quite immune from alteration, and the reverse appears to be the case with the ratio of stress. In the majority of cases, pitch and stress do not go in proportion.

8. In Hindustani, all the dissyllables and polysyllables have a rising pitch and there is but little difference in stress between syllables. Stress is the more fixed.

9. The final syllable of words uttered separately is high-pitched and bears strong stress in French. As has previously been pointed out, however, both pitch and stress undergo modification by the tone of the sentence.

We hear speech-sound not as individual phones or separate syllables but as a complete "Gestalt" from the standpoint of both tone and phoneme, which we shall term "auditory unit". For example, although Hindustani

is a language of stress accent, the difference in stress between syllables is quite small—so small that if the words are uttered with the same pitch, we very naturally fail to discriminate between them. As a result, there is a loss of intelligibility. (Fig. 44-A). This loss is compensated for, however, by means of the rise in pitch. Each word then forms a "Gestalt" from the standpoint of tone and becomes one "auditory unit"; a great deal of intelligibility being obtained. (Fig. 44-B).

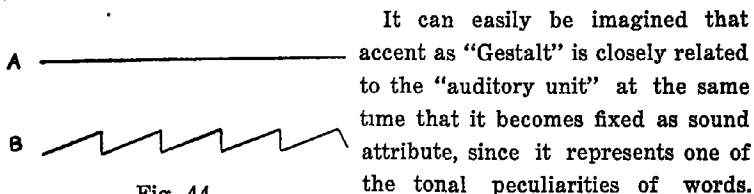


Fig. 44.

But in the case of Hindustani, the "auditory unit" has nothing directly to do with stress, the fixed element of accent, there being on the other hand, a close relation between itself and pitch, the non-fixed element. When both pitch and stress go to exhibit essential characteristic features of words as in German, each word is considered as an "auditory unit" by reason of its accent.

Now let us deal with other languages. First of all, a word becomes an "auditory unit" in Chinese by reason of its pitch accent, while a word or a collocation is the unit in Japanese and Mongolian. In Russian, too, a word is made a unit by stress accent and the rise in pitch on the "accented syllable". Again, in English, a word becomes a small unit by reason of its stress accent, and a combination of words forms a greater unit through the undulation of pitch. A phrase is made a unit in French chiefly by pitch.

On the strength of what has been said, I am confident that we have now come to conceive clearer ideas of many features of the determinate and non-determinate elements of tone, and of their relation one to the other, as they occur in various languages. Accordingly, it may be considered inappropriate to make any attempt at a definition of accent that considers the fixed element alone without paying the least attention to the non-fixed elements. This is especially so where pitch and stress go in proportion, as in Mongolian, with the result that both can be regarded as semi-determinate, as it were.

CONCLUDING REMARKS

Research into the nature and scope of accent in the light of experimental phonetics has been made, though in a very sweeping manner, in the preceding chapters. Of this, however, the author is not prepared to say that no stone has been left unturned, and it has to be frankly admitted that there remain many things untouched. In fact, much depends on future studies in which I trust everything will be dealt with on a much larger scale:

1. First of all, the study has to cover all types of accent in all languages of the world, i.e. research into the distribution of accent is necessary. In this present study of mine, experimental investigations have been made with regard to several of the languages.

2. Secondly, we shall have to go into details as to accent as it occurs in each language. Here, types and rules of word- and sentence-accent will be classified, and an analysis will be made of the relation between sentence accent on the one hand and contents of speech and word accent on the other. To this point, however, reference has been made here and there in my present study.

3. Thirdly, we have to know how the present system of distribution of accent has come into existence.

The writer will consider himself amply repaid for his labours if his present study should contribute, even a little, to the elucidation of the many problems that have hitherto remained unsolved and also if it should, as giving practical guidance in studies in that direction, serve for the purposes of the international studies of languages made under the auspices of the International Linguistic Association.

In conclusion, the writer has to express his sincere gratitude to those who have provided him with material by speaking at the microphone and to his colleagues for the good will shown and assistance extended to him during the course of the experimental work. He feels no less grateful to Mr. Masato Kajiyama who has devotedly assisted him at every stage of the experiments and has arranged a large supply of materials to make this study possible and also to Mr. Kōji Kōsaka who has been engaged in the work of enumeration and the production of diagrams.

APPENDIX

Measurement of the Duration of Speech-Sound.

∴ Though the statistical measurement of the quantity of speech-sound seems to be of no fundamental importance to the problem of accent, it may serve to help towards the understanding of the distinctive tonic characteristics of the languages treated in the present volume.

With this in view, the measurement of the length of sounds obtained from the oscillograms of English, German, French, Japanese, Chinese, Korean, Hindustani, Russian and Mongolian is given in a tabular form on the following pages:

(Note: If we want to calculate only the number of syllables uttered within a certain time unit, we may use a watch, but for the clear discrimination of delicate differences between individual phonemes and for the exact measurement of their time, this method is not sufficient.)

1. The heading on the upper left-hand corner in the subsequent tables indicates the numbering of those sentences treated in the third chapter of this volume.

2. In the second column is given the duration of time (the time unit being one second) required for the utterance of the respective sentences. This entire length of time divided by the number of syllables in the sentence (enumerated in the third column) and the number of phonemes (the fourth column) give the average time for each syllable (the fifth column) and the average time for each phoneme (the sixth column) in each sentence. The figures in the eighth column indicate either the lengths of pauses or the lengths of voiceless consonants, and the figures in the seventh column indicate the duration of time needed for the utterance of vowels, semi-vowels as well as voiced consonants in each sentence.

3. The enumeration of syllables is made in an ordinary manner, but in the case of the Japanese sentences, the unit is the *kana* that is consonant-vowel as used in the Japanese syllabary (which is not the same as an alphabet).

4. Sound unit means an individual phoneme in the ordinary sense of the word. Thus, Japanese *hana* and German *Obst* consist of 4 phonemes respectively, while in the case of English *cannot*, though phonetically two *n*'s fuse into one, each is counted separately.

Again, like the Japanese verbal ending *desu* of which the final *u* usually becomes mute, a bisyllable word containing a voiceless element is counted as one syllable, and a diphthong consists of two phonemes.

Chinese

A	B	C	D	E	F	G	H	I
3	1.03 ^{sec}	4	12	0.256 ^{sec}	0.086 ^{sec.}	100.0 [%]	0.0 [%]	0.256 ^{sec.}
4	1.04	4	10	0.260	0.104	89.8	10.2	0.234
5	1.04	4	12	0.260	0.087	97.1	2.9	0.252
6	1.21	6	15	0.201	0.082	94.2	5.8	0.190
7	1.10	5	12	0.220	0.092	100.0	0.0	0.220
Average	1.08	4.6	12.2	0.239	0.090	96.2	3.8	0.231

Note:

A=sentence number.

B=entire time.

C=number of syllables.

D=number of phonemes.

E=average time for each syllable.

F=average time for each phoneme.

G=time required for voiced elements.

H=time required for voiceless elements.

I=average time for each voiced syllable.

In Japanese, also, a long consonant or a long vowel is counted as two, but a long vowel in other languages makes one phoneme. We shall now examine in each language the degree of uniformity in average syllable time, average phoneme time and average voiced-syllable time mentioned in the above table and those that follow.

In English, both syllable time and phoneme time in the long sentence 1. are much longer than those in the short sentences 2. and 3. One reason for this may be that there is a very slight difference between average voiced-syllable times in those three sentences.

In German the time required for the utterance of each of the first 9 sentences which contain a good many long vowels is much longer on the whole than that required for each of the latter conversational sentences. In the former, the average syllable time is 0.247 sec. the aver-

Japanese

A	B	C	D	E	F	G	H	I
1	^{sec.} 1.44	11	17	^{sec.} 0.131	^{sec.} 0.085	[%] 85.7	[%] 14.3	^{sec.} 0.122
2	0.93	7	15	0.133	0.062	72.0	28.0	0.112
3	0.82	9	16	0.091	0.051	100.0	0.0	0.102
4	0.68	7	12	0.098	0.057	89.7	10.3	0.102
5	0.98	8	15	0.122	0.066	83.7	16.3	0.118
6	1.30	12	20	0.108	0.055	83.1	16.9	0.099
7	1.50	14	25	0.107	0.060	85.4	14.6	0.107
8	2.23	21	38	0.109	0.060	73.9	26.1	0.100
9	1.06	18	32	0.109	0.062	84.1	15.9	0.103
10	2.64	24	41	0.110	0.064	75.1	24.9	0.105
11	1.90	14	22	0.136	0.086	94.7	5.3	0.129
12	2.76	20	36	0.138	0.077	87.0	13.0	0.120
13	0.99	7	13	0.141	0.076	88.9	11.1	0.125
14	1.18	9	17	0.131	0.069	96.6	3.4	0.126
15	2.56	9	17	0.284	0.150	57.2	42.8	0.163
Average	1.60	12.7	22.4	0.130	0.073	83.8	16.2	0.115

Korean

A	B	C	D	E	F	G	H	I
1	^{sec.} 1.16	7	19	^{sec.} 0.166	^{sec.} 0.062	[%] 90.5	[%] 9.5	^{sec.} 0.157
2	0.72	4	11	0.180	0.065	94.4	5.6	0.170
3	1.12	7	15	0.160	0.075	81.2	18.8	0.130
4	0.76	4	11	0.190	0.069	76.4	23.6	0.145
5	0.55	4	7	0.137	0.078	100.0	0.0	0.137
6	0.73	3	8	0.243	0.092	100.0	1.0	0.243
Average	0.84	4.83	11.8	0.179	0.074	90.5	9.5	0.164

German

A	B	C	D	E	F	G	H	I
1	1.51 ^{sec.}	7	16	0.215 ^{sec.}	0.094 ^{sec.}	84.1 [%]	15.9 [%]	0.171 ^{sec.}
2	1.78	7	16	6.254	0.101	74.6	25.6	0.190
3	1.37	6	14	0.228	0.098	80.9	19.1	0.184
4	2.16	8	21	0.270	0.103	60.8	39.2	0.167
5	2.80	10	28	0.280	0.100	75.8	24.2	0.212
6	3.75	14	35	0.287	0.107	76.5	23.5	0.204
7	2.91	11	32	0.264	0.094	72.7	27.3	0.192
8	2.08	10	25	0.208	0.083	80.8	19.2	0.168
9	3.64	16	42	0.226	0.087	74.2	25.8	0.168
1'	2.24	12	29	0.186	0.077	77.7	22.3	0.145
2'	1.40	7	19	0.200	0.074	78.6	21.4	0.158
3	1.72	9	25	0.190	0.068	81.4	18.6	0.135
4'	1.10	8	22	0.175	0.064	67.4	32.6	0.118
5'	2.32	10	32	0.232	0.073	75.0	25.0	0.174
6'	1.42	7	17	0.202	0.082	82.8	17.2	0.167
7'	1.22	6	14	0.202	0.037	65.5	34.5	0.132
1-9	2.45	9.9	25.5	0.247	0.096	75.6	24.4	0.182
1'-9'	1.68	8.4	22.6	0.198	0.076	75.5	24.5	0.150
Average	2.11	9.3	24.2	0.225	0.087	75.5	24.5	0.169

English

A	B	C	D	E	F	G	H	I
1	16.68 ^{sec.}	57	148	0.293 ^{sec.}	0.113 ^{sec.}	64.0 [%]	36.0 [%]	0.188 ^{sec.}
2	1.48	8	19	0.185	0.078	90.5	9.5	0.176
3	2.78	16	40	0.173	0.069	77.7	22.3	0.134
Average	6.97	27.0	69.2	0.217	0.087	77.4	22.6	0.166

Hindustani

A	B	C	D	E	F	G	H	I
1	290 ^{sec.}	14	33	0.207 ^{sec.}	0.088 ^{sec.}	85.7 [%]	14.3 [%]	0.177 ^{sec.}
2	2.68	16	39	0.168	0.069	86.7	13.3	0.145
3	1.96	10	25	0.196	0.078	75.9	24.1	0.165
4	3.98	21	48	0.189	0.083	78.4	21.6	0.148
5	3.18	15	39	0.212	0.082	80.1	19.9	0.170
6	2.34	11	24	0.213	0.098	82.7	17.3	0.176
7	1.68	9	24	0.187	0.070	79.5	20.5	0.149
8	2.35	14	30	0.168	0.078	90.1	9.9	0.151
9	5.18	24	58	0.216	0.089	75.7	24.3	0.163
10	1.10	7	15	0.157	0.073	88.3	11.7	0.139
11	1.22	7	15	0.174	0.081	91.5	8.5	0.159
12	1.04	6	12	0.174	0.080	88.1	11.9	0.153
13	1.21	7	16	0.173	0.076	82.2	17.8	0.142
Aver- age	2.37	12.4	29.2	0.187	0.080	83.4	16.6	0.157

French

A	B	C	D	E	F	G	H	I
1	1.34 ^{sec.}	6	11	0.224 ^{sec.}	0.122 ^{sec.}	87.4 [%]	12.6 [%]	0.196 ^{sec.}
2	2.42	11	22	0.242	0.110	78.5	21.5	0.190
3	4.28	19	46	0.225	0.093	77.8	22.2	0.175
4	8.10	36	95	0.225	0.085	67.4	32.6	0.152
5	9.31	42	100	0.221	0.093	78.6	21.4	0.174
Aver- age	5.09	22.8	54.8	0.227	0.101	78.0	22.0	0.178

Russian

A	B	C	D	E	F	G	H	I
1	0.50 ^{sec}	3	7	0.200 ^{sec}	0.080 ^{sec}	85.0 [%]	15.0 [%]	0.170 ^{sec}
2	1.00	5	11	0.200	0.091	64.0	36.0	0.128
3	2.98	22	46	0.135	0.065	76.8	23.2	0.109
4	1.28	7	22	0.183	0.058	83.7	16.3	0.173
5	1.44	8	19	0.150	0.076	82.6	17.4	0.163
6	1.04	7	14	0.148	0.074	84.6	15.4	0.125
7	1.20	7	15	0.172	0.030	87.3	12.7	0.143
8	0.74	5	9	0.148	0.082	72.9	27.1	0.100
9	1.15	6	11	0.193	0.103	79.7	20.3	0.154
10	1.02	8	16	0.123	0.054	98.0	2.0	0.125
11	1.03	3	6	0.350	0.180	100.0	0.0	0.360
12	1.27	4	9	0.253	0.119	81.3	18.7	0.218
Average	1.22	7.07	15.4	0.173	0.090	83.2	16.8	0.165

Mongolian

A	B	C	D	E	F	G	H	I
1	2.80 ^{sec}	14	32	0.200 ^{sec}	0.082 ^{sec}	95.7 [%]	4.3 [%]	0.192 ^{sec}
2	3.78	18	44	0.210	0.086	87.8	12.2	0.182
3	1.84	8	19	0.230	0.097	95.7	4.3	0.220
4	2.24	7	18	0.320	0.124	80.3	19.7	0.257
5	1.38	7	15	0.197	0.092	100.0	0.0	0.107
6	1.68	8	18	0.210	0.093	100.0	0.0	0.210
7	1.35	5	12	0.272	0.113	92.6	7.4	0.254
8	1.39	7	14	0.199	0.099	100.0	0.0	0.199
9	1.08	4	11	0.270	0.098	90.8	9.2	0.245
10	4.20	16	34	0.263	0.123	91.9	8.1	0.242
Average	2.13	9.4	21.7	0.237	0.101	93.5	6.5	0.220

age phoneme time being only 0.096 sec., while in the latter they are 0.198 sec. and 0.076 sec. respectively.

In French, though 5 sentences either long or short were spoken by two men and one lady (see Chapter III, 5), the average syllable time is quite uniform. This fact evidently shows that both sentence accent and word accent have much in common in their qualities.

In Japanese, with the exception of the last sentence, *I congratulate you on your graduation ceremony*, the average phoneme time and the voiced-syllable time agree with each other. (Note: it is quite natural that the sentence just referred to should differ from other sentences in its tonic style as it is a part of a congratulatory message given by the Minister of Education at the graduation ceremony.)

In Chinese, phoneme time shows more uniformity than syllable time, whereas in Korean a greater uniformity is found in phoneme time with a single exception in the last 2 sentences *Where are you going?* and *I don't know*.

In Hindustani both syllable time and phoneme time show an equal degree of uniformity, while in Russian there is a great deal of discrepancy between them, and in Mongolian there is only a slight uniformity in phoneme time.

	A	B	C	D	E	F	G
English	2.56	44:56	0.217 ^{sec.}	0.087 ^{sec.}	77.4 [%]	22.6 [%]	0.166 ^{sec.}
German	2.59	41:59	0.225	0.087	75.5	24.5	0.169
French	2.40	60:40	0.227	0.101	78.0	22.0	0.178
Russian	2.17	83:17	0.193	0.090	83.2	16.8	0.165
Korean	2.43	57:43	0.179	0.074	90.5	9.5	0.164
Japanese	1.76	(76:24)	0.130	0.073	83.8	16.2	0.115
Chinese	2.65	35:65	0.239	0.090	96.2	3.8	0.231
Hindustani	2.35	65:35	0.187	0.080	83.4	16.6	0.157
Mongolian	2.30	70:30	0.237	0.101	93.5	6.5	0.220

Note: A=number of phonemes divided by the number of syllables.
 B=proportion between syllables containing two phonemes and those containing three phonemes.
 C=mean average time for each syllable.
 D=mean average time for each phoneme.

E=average time for voiced elements.

F=average time for all voiceless elements.

G=mean average time for each voiced syllable.

The table on the preceding page shows the average time for each item in the respective languages.

The first column shows the result obtained by dividing the number of phonemes which constitutes one syllable.

In the second column is given the percentage of two or three phonemes.

This percentage is the result obtained by calculating the numerals given in the first column. In English, for instance, the number of syllables consisting of two phonemes is 44% and that of those consisting of three phonemes is 56%. In Japanese all the syllables are confined to those consisting either of two phonemes or one phoneme.

The average of syllable time measured in this manner differs considerably according to the sentences themselves, not to speak of the tone or style of speech or individual propensity of the speaker, but the average times given in the table on the preceding page may, on the whole, be regarded as the speed of speech-sound in a language.

Then we shall see how this stands relatively in respective languages dealt with in this study:—

Syllable time is longest in Chinese showing 0.239 sec. (the characteristic feature of Chinese is to form a word by any one single syllable as already described in Chapter III). Mongolian is just about the same as Chinese in this point. In French, German and English it is about 0.22 sec., whereas in Russian, Hindustani and Korean it is about 0.19 sec. But in Japanese it is extremely short being only 0.13 sec. This is no doubt due to the peculiar structure of Japanese syllables.

In the length of voiced-syllable time also, Chinese and Mongolian occupy the foremost position showing 0.231 sec. and 0.220 sec. respectively. French, German, English, Russian, Korean and Hindustani come next ranging between 0.178—0.157 sec., while in Japanese it is only a half of Chinese showing 0.115 sec.

The proportion of syllables consisting of two phonemes and those of three phonemes is as follows:—

In Russian it is 83%:17% showing by far the greater number of the

former. Mongolian comes next. In Hindustani, French and Korean the proportion is about 60%:40%, while in English and German it is about 40%:60%. In Chinese it is 35%:65%, whereas in Japanese the proportion of syllables consisting of two phonemes and a single phoneme is 76%:24% showing the nearest approach to Russian in respect to the number of syllables consisting of two phonemes.

The time of one single phoneme, however, has not so much variety in length as that of one single syllable. According to my calculation, it is longest in French and Mongolian extending as far as 0.101 sec., but this decreases in the following order:—

Chinese, Russian, English, German, Hindustani, Korean and Japanese.

The End.

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